Vol. 10. No. 1 pp. 1-68. January, 1940

IMPERIAL MYCOLOGICAL INSTITUTE
1 JAN 1940

THE VETERINARY BULLETIN

1940

WEYBRIDGE:
IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net Annual Subscription £2

Imperial Agricultural Bureaux.

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GREAT BRITAIN.

Dairy Science Abstracts.

FRANCE.

Bulletin d'histologie appliquée à la physiologie et à la pathologie et de technique microscopique.

YUGOSLAVIA.

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Glasnik centralnog hijienskog zavoda.

CUBA.

Revista de medicina tropical y parasitologia, bacteriologia, clinica y laboratorio.

AUSTRALIA.

Australian Journal of Science.

JOURNALS WHICH CEASED PUBLICATION IN 1939.

FRANCE.

Revue de microbiologie appliquée.

GERMANY.

Fachblatt der sudeten deutsche Tierarzte.

JOURNALS WHICH CHANGED THEIR NAME IN 1939.

GREAT BRITAIN.

Advancement of Science. *Continuation of* Report of the British Association for the Advancement of Science.

GERMANY.

Beiträge zur Geschichte der Veterinärmedizin. *Continuation of* Veterinärhistorische Mitteilungen.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 10.] **January, 1940.** [No. 1.

DISEASES CAUSED BY BACTERIA AND FUNGI

SCHORTINGHUIS, J. (1937). Streptococcen-Mastitis. [**Mastitis**]. pp. 35. [1 ref.] Leiden: A. W. Sijthoff's Uitgeversmaatschappij N.V. [8vo].

A limited review of some aspects of mastitis, consisting largely of quotations from the literature.—J. E.

STABLEFORTH, A. W. (1938). **Bovine Mastitis.**—*Agr. Progr.* **15.** 8-15.
MINETT, F. C. (1938). **Bovine Mastitis.**—*J. Fmrs' Cl. Lond.* Part 5. pp. 75-93. [7 refs.]

Both authors review the common types of bovine mastitis occurring in Great Britain, particular attention being given to chronic streptococcal mastitis.

They point out that non-clinical cases of chronic streptococcal mastitis are a grave source of infection, as the risk of infection is present even during the quiescent stage. They say that 30 % of milch cows are infected and that a relatively greater milk loss occurs in infected cows of the higher yielding breeds.

Routine cultural examinations are necessary for the strict control of this disease; and the general hygienic precautions necessary to reduce the spread of the infection are also discussed in both papers. S. estimates that the loss occasioned in Great Britain by the reduction in the yields of cows affected with chronic streptococcal mastitis is nearly £2,000,000 per annum. He mentions, incidentally, that *Brucella abortus* infection of the udder is apparently also responsible for a not insignificant reduction in the milk yield.—H. E. BYWATER.

STABLEFORTH, A. W. (1939). **Bovine Mastitis.**—*Vet. Rec.* **51.** 469.

A short version of the first reference of the preceding abstract.

DAVIS, J. G., & ROGERS, H. J. (1939). **A Simple Confirmatory Medium for *Str. agalactiae*.**—*J. comp. Path.* **52.** 132-134. 1 table. [9 refs.]

The production of acid and clot in yeast litmus milk, and failure to ferment aesculin, are constant characters of *Str. agalactiae*. These reactions can be simply determined in a medium consisting of yeast litmus milk to which aesculin and ferric chloride have been added.

Acidity and clotting without reduction or darkening of the medium can be taken as presumptive evidence of *Str. agalactiae*. The authors consider that the only other streptococci giving a similar reaction which may be encountered are certain non-aesculin fermenting strains of *Str. pyogenes*.—JOHN FRANCIS.

I. LITTLE, R. B. (1939). **The Cultural and Clinical Significance in Bovine Mastitis of Nonhemolytic Streptococci that ferment Aesculin.**—*J. Amer. vet. med. Ass.* **94.** 496-500. 1 table. [9 refs.]

II. LITTLE, R. B. (1939). **Group Similarity of Alpha hemolytic Bovine Mastitis Streptococci for Lancefield's Serological Group C.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 254-255. [4 refs.]

I. During the course of these observations, about three years, there were approximately 19 cows in the herd. They were kept under ideal hygienic conditions. In the first examination seven cows were found to be infected with *Str. agalactiae* and they were disposed of. These and a few other cows were replaced by in-calf heifers.

The fore milk was examined monthly. Strains of typical group III mastitis streptococci (Minett) were obtained from six cows. There were also two atypical strains isolated. One failed to ferment lactose, saccharose, raffinose and inulin and did not hydrolyse Na hippurate; the other failed to ferment inulin and sorbitol but fermented raffinose and grew on 40% bile agar. Clinical and bacteriological findings in the eight affected cows are given. In only one case was there marked alteration in the milk, but slight induration of the udder was usually a feature of the disease. One cow was affected for 14 months but unaffected for the remaining 10. One cow was affected for 9 months, clear for 14 months, and then became infected again.

The fact that there was no recurrence of *Str. agalactiae* infection indicates that the sole reservoir of this organism is the bovine udder. The chances of direct transmission of the group III streptococci were slight, and it is considered that before these, and other streptococci causing acute mastitis, can be eliminated, more must be learned regarding their natural habitat.

II. Fifteen strains of mastitis group II streptococci (*Str. dysgalactiae*) were studied. All strains possessed an antigen which gave group precipitin reactions with sera of Lancefield's serological Group C. Group specific antibodies in Group C sera obtained from Lancefield could be removed by absorbing with a Group II mastitis strain. Antisera prepared against formalin-killed cultures of Group II streptococci were precipitated by haemolytic Group C strains. The author had been informed by Plastridge that strains originally classified by him as *Str. pseudo-agalactiae* belong to Group C, and are culturally identical with *Str. dysgalactiae*.—JOHN FRANCIS.

KRAGE, & TIEDGE. (1938). Die Aetiologie der bösartigen Druse bei Fohlen. **[Aetiology of Virulent Strangles in Foals].**—*Dtsch. tierärztl. Wschr.* **46.** 772-774. [3 refs.]

The history of strangles in East Prussia is outlined. Outbreaks are described in which secondary infections occurred; strangles antiserum was of no value. *Salmonella enteritidis* was found in four outbreaks examined by the authors, *Bact. equirulis* in two and *Corynebacterium diphtheriae* in four. The complication due to *S.e.* infection was often associated with verminous aneurism; it is characterized by slight fever, swellings of the legs, joints and tendon sheaths, and rapid cachexia. In the complications caused by *Bact. equirulis* there was bad healing of incised intermandibular abscesses and a putrid odour. In cases in which *Corynebact. diphtheriae* occurred there was diphtheritic pharyngitis. Examination of urine and faeces and blood tests are recommended to detect *S.e.* infections; *Bact. equirulis* can be demonstrated in the affected organs only at autopsy. Experience is necessary before the various types of strangles can be distinguished by the clinical picture.—V. CHLÁDEK (PRAGUE).

UMENO, S. (1938). **On the Colony-Type of *Streptococcus equi*. II. Comparison of Biological Activity, Virulence and Variation between the Three Colony Types.**—*Kitasato Arch.* **15.** 294-317. 13 tables. [Numerous refs.] [In English]. [See also *V. B.* **9.** 362].

Certain cultural, physico-chemical and biological tests were applied to the G, F and C colony types of *Str. equi*. The viability in broth of five strains of the G type was less than that of the type F and C strains, and estimation of the final pH in 1 % glucose-broth cultures showed that, in the G type only, acid production increased with repeated sub-culture. Twelve strains of the F type grew on serum agar containing 20 % bile, while all type G and C strains failed to grow on it. In methylene blue milk, 16 strains of each caused reduction, reaching a maximum in 24 hours for the F type and in 3-4 days for the G and C types. The bacteriostatic action of ten different aniline dyes on twelve strains of each type proved weakest for the F type, which was also shown to be most heat-resistant. Intraperitoneal injection of mice with diluted blood-agar cultures of all three types demonstrated that the C type was least virulent by far. Toxin production in trypsin digest meat cultures was tested by intradermal injection of eight rabbits. The G type was shown to be most and the F type least toxigenic. 120 strains comprising each type failed to hydrolyse sodium hippurate. Study of variation by sub-culture in bouillon and 10 % serum-broth indicated that the F type was most and the G type least stable.—R. O. MUIR.

I. THOMSON, S. (1937). **The Erythrogenic Toxins of Haemolytic Streptococci.**—*Edinb. med. J.* **44.** 235-244. 8 tables. [8 refs.]

II. COFFEY, Julia M. (1938). **Further Observations on the Toxigenic Properties of Hemolytic Streptococci.**—*J. Immunol.* **35.** 121-130. 5 tables. [18 refs.]

I. The ball mill method was used to prepare endotoxins from three strains of streptococci; a puerperal fever, a scarlet fever and an erysipelas strain. [The serological classification of these strains is not given.] Skin tests on 20 patients with various streptococcal conditions failed to reveal any qualitative differences in the endotoxins. It was found that, if exotoxic filtrates of low potency were used to prepare toxin for the Dick test, anomalous results were obtained, which were believed to be due to the presence of endotoxin. Using highly potent toxic filtrates from the above three strains, suitably diluted, and a commercial Dick toxin, complete correlation of results was obtained. Commercial (Parke Davis) erysipelas or scarlet fever antitoxic sera neutralized the exotoxin from all three strains as judged by skin tests. Puerperal fever antitoxic sera (Parke Davis) only neutralized the antitoxin from the puerperal fever strain.

II. 597 cultures of streptococci from human and animal sources were studied. They were classified by group precipitin tests. (Groups C and G were considered to be related, so the designation C-G is used in this paper.) Strains were considered virulent if the intraperitoneal injection of 0·1 c.c. of 18-hour broth culture was fatal to mice in 24 hours. Toxin and toxin-antitoxin reactions were studied by cutaneous tests in rabbits. Approximately 20 % of groups A, B and D and 54·1 % of group C-G were virulent. Other groups were non-virulent. 83·7 % of group A and 9·4 % of group C-G were toxigenic; other groups were non-toxigenic. The percentage of virulent strains in groups A and C-G was higher in those from animal sources. The reverse was true in group B strains. The toxin of all strains was neutralized by antitoxins prepared from three broadly virulent toxins. However, strains within one particular group differed markedly in the character of their toxins. The species of animal in which antitoxic sera were prepared appeared to influence their properties.—JOHN FRANCIS.

COTONI, L., & POCHON, J. (1938). Étude des extraits toxiques de streptocoques en sérum animal. **[Toxic Extracts of Streptococci in Animal Serum].**—*Ann. Inst. Pasteur.* **61.** 45-53. 1 table. [8 refs.]

Using Weld's (1934-1935) medium and technique [*V. B.* **4.** 597, and **9.** 600.] the authors demonstrated a toxic factor in streptococci. The organisms were centrifuged to remove them from the liquid medium (details of its preparation are given) and then shaken with inactivated serum. The resulting product was lethal for mice and rabbits by the intravenous route in from a few minutes to a few hours. This toxin was most easily obtained from haemolytic strains of human origin. There was a correlation between the pathogenicity of the strain for mice, its haemolytic power, and its toxicity. The authors consider this toxin to be closely related to the haemolysin, on the grounds that it causes considerable haemolysis *in vitro,* is filtrable, difficult to preserve, susceptible to heat and changes in pH, and not antigenic; nevertheless, certain strains though haemolytic may lack this toxic effect.—D. L. HUGHES.

MERCIER, P. (1939). Sur la toxinogénèse staphylococcique. **[Toxin Production by Staphylococci].**—*Rev. Immunol.* **5.** 289-298. 2 tables. [10 refs.]

Four hundred cultures of staphylococci were studied; the majority were isolated from various human infections, and a few from normal throats and from water and dust.

The organisms were grown in various types of fluid media, some being those used for the production of *Corynebacterium diphtheriae* toxin. An atmosphere containing CO_2 greatly increased toxin production. Using the haemolytic power of the toxin as an index of its potency, some strains were found to produce toxin in one medium but not in others. In most cases maximum toxin production occurred after seven days' incubation.

About 75% of the strains produced typical toxin, but in only four of these was high toxin production maintained after periods of sub-culture. Neither pigmentation nor pathogenicity were closely related to toxin production. M. considers that toxin production plays an important part in the pathogenicity of staphylococci, which explains the success of toxoid therapy.—JOHN FRANCIS.

LEVINE, B. S. (1938). **Studies of Staphylococcal Toxin. The Toxin-Red-Cell Reaction.**—*J. Immunol.* **35.** 131-139. 5 tables, 3 graphs. [8 refs.]

This is a study of the nature of the reaction involved in the lysis of red blood corpuscles. Previous results of other workers with tetanolysin are considered.

Series of varying concentrations of staphylococcal toxin and of rabbit cell suspensions were incubated at 37°C. for one hour and placed in the cold room overnight. Readings of the points between complete haemolysis and the beginning of lysis inhibition were made the following morning. One series of five and another series of ten experiments were made using this technique. A further series of experiments were undertaken in which a known number of staphylococcal-haemolysin units were allowed to act on rabbits' red cells. Complete haemolysis was produced and the amount of free haemolysin remaining was estimated. From the results of the above experiments, equations of the Freundlich-adsorption type could be obtained, and analytic geometric methods led L. to believe that the immediate reaction step taking place between staphylohaemolysin and rabbits' red cells was of the adsorptive type.—JOHN FRANCIS.

BLAIR, J. E. (1939). **The Pathogenic Staphylococci.**—*Bact. Revs.* **3.** 97-146. [Numerous refs.]

This is a review of numerous recent contributions to the study of staphylococci.

It is stated that many but by no means all pathogenic staphylococci produce a soluble toxin comparable in antigenicity and other properties to other well-known bacterial toxins, but comparatively few produce a potent lethal toxin. For its preparation the composition of the medium is of the utmost importance, a broth or semi-solid agar medium being generally used. Cultures should be incubated in 20-40% CO_2.

Staphylococcus exotoxin is thermolabile, toxicity being lost at 55-60°C. It is also sensitive to light and oxidation. It is filtrable and can be precipitated by acetic and trichloracetic acids. A toxoid can be prepared with formaldehyde, and alum-toxoid is a particularly good antigen. An antitoxin of high titre can be produced in laboratory animals.

Culture filtrates are stated to have lethal, dermonecrotic and haemolytic action, but whether these effects are due to a single toxin whose action varies on different cells or whether separate toxic factors exist is as yet undetermined. The latter seems probable as some filtrates lack one or more toxic factors.

Rabbits, particularly adults, are the most susceptible of laboratory animals to the lethal effects of the toxin. For tests it is given intravenously as it is without effect when given by the mouth. Death may occur within a few minutes, or take 2-24 hours or longer. Dermonecrotoxin appears to parallel lethal toxin as to development, properties and antigenicity. The haemolytic action of toxic filtrates is due to at least two antigenically distinct haemotoxins—α toxin and β toxin. The latter is characteristic of animal staphylococci and is not related to human pathogenicity. It should be noted that haemolysis in blood agar is not necessarily related to the production of a soluble haemotoxin.

In addition to these toxins most staphylococci produce an antigenic leucocidin, and a coagulase which is very stable and heat resistant. Some, almost exclusively human strains, produce fibrinolysin, but its action is considerably slower than that of streptococcal fibrinolysin.

Relatively few staphylococci produce enterotoxin, a toxin which has been associated with food-poisoning chiefly in North America. It can be distinguished from exotoxin by its thermostability—it is not destroyed by exposure to 100°C. for 30 minutes—and the fact that it remains unchanged by formaldehyde in the strength used for the preparation of staphylococcus toxoid. Staphylococci which produce enterotoxin do not show any biological or biochemical reactions which distinguish them from other pathogenic staphylococci.

Of the many *in vitro* reactions proposed for the differentiation of pathogenic and non-pathogenic strains, the coagulase test alone is considered to be the best indicator of pathogenic potentiality of staphylococci. Haemolysis and pigment-production frequently give parallel results to the coagulase test, but variations are too frequent for either to be satisfactory. No satisfactory distinction can be obtained by agglutination and agglutinin-absorption tests, but precipitin tests appear to show that a broad distinction can be made.

In conclusion B. reviews the mode of infection of staphylococci in the light of the various properties of the organisms. He states that one should guard against attributing pathogenic action primarily to toxins. Certainly, toxin is not the sole aetiologic factor, and it seems possible that it plays only a subordinate part in both human and animal infections.—GWILYM O. DAVIES.

I. IVANOVICS, G. (1938). **The Standardisation of Anti-Anthrax Sera.**—*Bull. Hlth Org. L.o.N.* **7.** 836-844. 3 tables. [Numerous refs.]

II. JONESCO-MIHAIESTI, C. (1938). **Assays of Anti-Anthrax Serum Carried out at the Cantacuzino Institute.**—*Ibid.* 827-835. 2 tables.

I. The author speaks of the difficulty in making an accurate titration of anti-

anthrax serum by serum-culture animal inoculation tests. The specific value of the serum in human infections has not been agreed upon. Human beings are relatively resistant to localized anthrax infections as compared with certain animals; when serum is used on human cases enormous doses are commonly given, and in those circumstances non-specific action may operate to some extent.

A serum has been produced in rabbits which contains a demonstrable antibody against the capsular material of the bacillus. The capsule is a polypeptide substance and not a polysacharide as is the case with the capsule of the pneumococcus. Work done has indicated that the anti-capsular antibody is in some respects analogous to, though apparently less important in immunity than, that of the pneumococcus. The anthrax anti-capsular antibody can be produced by the intravenous injection into rabbits of large quantities of heat-killed encapsulated bacilli. Such serum precipitates purified capsular substance in high dilutions, agglutinates encapsulated bacilli, and produces with the capsules the so-called " Quellungsreaktion ". In addition such serum shows good protection in mouse-inoculation tests, and I. suggests that this protection is conferred by the anti-capsular antibody. This serum does not however protect rabbits even though it protects mice.

So far the anti-capsular antibody has only been produced in rabbits and its preparation in these animals is not regularly achieved. Serum from rabbits inoculated with the same culture and which does not contain the antibody is devoid of protective power. When this antibody is absorbed out of the serum, the serum ceases to possess protective power, and when purified capsule substance is injected into passively-immunized mice, they lose their passive protection.

Commercially prepared anti-anthrax (horse) sera tested did not protect mice. In an attempt only one horse out of a batch used produced the anti-capsular antibody in its serum. It is not yet known whether anti-capsular antiserum is of value in serotherapy for human beings or domestic animals. [See also *V. B.* **9.** 601].

II. Three antigen fractions of *Bacillus anthracis* were extracted :– one possessing nucleo-protein characters, slightly active serologically, another of a nitrogenous nature found in the capsular forms of the bacillus, and a third of a polysaccharide nature, found in both forms of the bacillus. The anti-capsular antibody appears to exert the most protective action in immunity.

An attempt was made to form a basis of standardization by a correlation of the precipitin content of the serum with its content of capsular and/or somatic antibody. It was found that there is a parallelism between precipitin content and protective power *in vivo* and that anti-capsular antibody has a high precipitating power. The author believes that both capsular and somatic antigens play an important part in immunization.—F. H. Manley.

Bongert, J. G. (1938). Ständige Zunahme der Tuberkulose bei Kälbern und deren Ursache. [**Cause of the Constant Increase of TB. in Calves and Swine**].—*Dtschr. tierärztl. Wschr.* **46.** 579-584 and 599-602. 2 tables.

In the first part of this article figures are set out to show that there has been a steady increase of the incidence of TB. in calves and young pigs killed in German abattoirs during recent years. This is attributed to the extensive feeding of these animals with tuberculous milk which is raw or inadequately heated. The second portion consists of a critical discussion of the value of " holder " and " flash " pasteurization for the destruction of tubercle bacilli. This section includes a fairly critical discussion of some of the modern commercial pasteurizing systems. B. describes the tests available for deciding whether it is safe for consumption;

a brief discussion of the public health significance of inadequate pasteurization is given.—E. J. PULLINGER.

—. (1938). Portugal. Loi sur la prophylaxie de la tuberculose. (Du 23 novembre 1935). [**Portugal: Law of 23rd November, 1935 on the Prophylaxis of Animal TB.**]—*Bol. pec., Lisboa.* **6.** 51-54. [In French]. [Also appeared in *Bull. Off. internat. Epiz.* **17.** 460-463].

The Veterinary Department of the Ministry of Agriculture, Portugal, is authorized to deal with the control of tuberculosis. Under this decree areas will be declared in which the disease will be eradicated. All suspected animals [presumably clinical examination] will be slaughtered and their carcasses disposed of; compensation on a dead weight basis is payable to owners of registered dairy cattle that are slaughtered. The registration and marking of cattle in the areas is compulsory, an annual tax being payable by the owners. The veterinary authorities are to be notified of the introduction of dairy cattle, and of deaths and movements. Registered animals are to be slaughtered only at municipal abattoirs and under veterinary supervision. Periodic tuberculin testing of cattle at the owner's expense is obligatory; the sale and use of tuberculin is to be restricted to members of the medical and veterinary professions. Cow-sheds will be inspected and the hygiene of milk production will be under supervision, a levy on the milk being taken.

DE MEDEIROS, J. L. (1938). Contribuição ao estudo da tuberculose bovina no Brasil. [**Bovine TB. in Brazil**].—*Bol. Soc. brasil. Med. vet.* **8.** 288-320. 2 figs. on 1 plate, 5 tables. [Numerous refs.]

The author draws attention to the need for control of TB., and much of the article consists of matter that is of the nature of propaganda on this question. —S. TORRES.

MAGGIORA-VERGANO, R. (1938). L'infezione tubercolare negli animali domestici. [**Tuberculosis in Domestic Animals**].—*R. C. Ist Sanità Pubbl.* **1.** 321-333. 2 figs. [18 refs.]

A general discussion on TB. in dogs and cats with a few case records. No new knowledge.

FERREIRA, A. J. (1938). A tuberculose aviária em Portugal. Estudo bacteriológico de alguns casos. [**Avian TB. in Portugal**].—*Bol. pec., Lisboa.* **6.** No. 1. 3-13. 5 figs., 1 table. [10 refs.] [French summary p. 275]. [Translated from *Arch. Inst. bact. Cam. Pest.* **7.** 181-196. (1936)].

P.M. examination of 5,000 market birds revealed an incidence of only 0·44%, comparing extremely favourably with other European figures. Lesions were confined to the crop, intestine and liver. They presented nothing abnormal. Cultures isolated from these birds are described.—J. PASFIELD.

I. MURPHY, W. A., & DUERSCHNER, Dorothy R. (1938). **Culture versus Guinea Pig Inoculation in the Diagnosis of Tuberculosis.**—*J. Lab. clin. Med.* **24.** 70-75. 2 tables. [11 refs.]

II. GUGGENHEIM, A., & FINKELSTEIN, M. (1939). **The Demonstration of Tubercle Bacilli by Culture and by Guinea Pig Inoculation.**—*Amer. Rev. Tuberc.* **39.** 397-407. 5 tables. [Numerous refs.]

I. Two hundred specimens of sputa, pleural fluids, etc., were examined microscopically and 171 revealed no acid-fast bacilli. Each negative specimen

was treated with sodium hydroxide for one hour and, after neutralization, was sown on to Petragnani's medium; g. pigs were also inoculated with a saline suspension of the centrifuged deposits. Thirty-one positive results were obtained by culture and 26 by g. pig inoculation; hence the culture medium showed a slightly greater sensitivity. The percentage of g. pig fatalities greatly exceeded the percentage of complete culture contaminations. The culture method is recommended as a valuable adjunct to routine slide examination.

II. Until recent years g. pig inoculation was found to be more effective than cultural methods in demonstrating tubercle bacilli in sputum, urine, pus, etc., but by improvements in the cultural technique the possibility of obtaining positive results by this method has increased; in some cases investigated by the author specimens negative by g. pig inoculation were positive by culture. By the repeated examination of sputa and other materials by direct smears, g. pig inoculation and cultural methods were often found to be unnecessary. 85% of the sputum smears considered negative by direct examination remained negative after cultural and biological tests. It is suggested that the best method of demonstrating tubercle bacilli is by the examination of several direct smears followed by cultures if the smears are negative, and finally, g. pig inoculation of all material negative by culture.—E. C. Hulse.

I. Corper, H. J. (1938). **Course of Experimental Tuberculous Infection in Guinea Pigs. Pathologic Changes Produced by Massive Intravenous Injections of Virulent and Avirulent Tubercle Bacilli.**—*Arch. Path.* **26.** 109-131. 10 figs. [Numerous refs.]

II. Herrold, R. D., & Woolsey, Carrie I. (1938). **Observations on Guinea Pigs given Intracutaneous Injections of Tuberculous Exudates.**—*Ibid.* 374-376. 1 fig.

I. The intravenous injection of 100 mg. of avirulent human tubercle bacilli into g. pigs produced exudative and proliferative reactions similar to those produced by other irritants. Most of the large clumps of bacilli became lodged in the lungs, and the tissue changes therein were more pronounced than in the liver, spleen or kidneys. Acid-fast bacilli disappeared before the onset of resolution of the affected tissues, and acid-fast globules and granules only were to be found. No multiplication of avirulent human or bovine (BCG) bacilli was detected after the intravenous inoculation of large doses (100-200 mg.). The tissue reaction was influenced by the number of bacilli present.

The injection of large doses of virulent human tubercle bacilli caused reactions closely resembling those produced by avirulent bacilli, although the degree of tissue reaction was more pronounced. This reaction was caused by the rapid multiplication of the virulent bacilli.

II. The reaction of the g. pig to intracutaneous inoculation of certain tuberculous material was investigated, with the aim of finding a method that would decrease the average period required for diagnostic purposes. In some cases, tubercle bacilli were demonstrable in an early skin lesion on the seventh day after inoculation of 0·4 c.c. of tuberculous exudate or urinary deposit. This method is of advantage in that it eliminates errors in diagnosis arising from spontaneous tuberculous infection in g. pigs. The course of the skin lesion may give some indication of the virulence of the particular tubercle bacilli.—E. C. Hulse.

Boer, H. D. (1936). Onderzoek naar het voorkomen van longtuberculose, veroorzaakt door rundertuberkelbacillen bij volwassenen in Zuid-Holland. **[Human Pulmonary TB. Caused by Bovine Type Bacilli in South Holland].**

—*Versl. TubercStudComm., 's Grav.* No. 10. pp. 77-84. [6 refs.] [English, French and German summaries].

Six cases of bovine type infection were detected among 206 cases of human pulmonary TB. in South Holland. Five of the six cases were country dwellers [cf. RUYS, *V. B.* **7.** 572].—J. E.

PIKKARAINEN, J. (1938). Typus bovinus ihmistuberkuloosin aiheuttajana. **[Bovine Strains of Tubercle Bacilli as the Cause of Human Tuberculosis].** —*Arb. sero-bakt. Inst. Univ. Helsinki.* **10.** 1-21. 7 tables. [Numerous refs.] [German summary].

P. first deals with the incidence in Europe of the bovine type of TB. in man, and makes a brief mention of the incidence in Finland. In Finland, contrary to the conditions in western, central and southern Europe, human TB. is wide-spread, and bovine TB. is rare. In round figures, about 0·1% of the cattle in Finland are now infected, while in 1936 2·4% of the tested cattle gave positive reactions to the tuberculin test.

P. typed 140 strains from cases of human TB., including 58 strains from children under the age of fifteen. All were the human type.

—R. STENIUS (HELSINKI).

WILSON, G. S., & SCHWABACHER, Herta. (1937). **The Relationship between Moist Weight and Numbers of Total and Viable Organisms in Cultures of Tubercle Bacilli.**—*Tubercle, Lond.* **18.** 161-167. 2 tables. [16 refs.]

Homogenous suspensions of tubercle bacilli were prepared and an attempt was made to estimate the total number of organisms in a given weight of culture and the relative number of viable bacilli in the same suspension. The counts were made in a specially designed chamber with dark ground illumination, while the proportion of living organisms was determined by sowing suitable dilutions on a variety of media. Much of the data was obtained with the avian bacillus. It was estimated that 1 mg. of a culture 2-3 weeks old contained from 1,200 to 1,300 million organisms. Only a proportion of the bacilli in a given suspension was living, *viz*, about 55% of the avian, 8·8% of the bovine, and 4·7% of the human types. Reasons are given for believing that the latter two figures represent an underestimation of the real values.—R. E. GLOVER.

MENZEL, A. E. O., & HEIDELBERGER, M. (1939). **Specific and Non-Specific Cell Polysaccharides of a Bovine Strain of Tubercle Bacillus.**—*J. biol. Chem.* **127.** 221-236. 5 tables, 3 charts. [12 refs.]

Continuing their investigation into the nature of polysaccharides isolated from tubercle bacilli, the authors describe the split products obtained from a bovine strain grown on a synthetic medium, defatted after drying, and percolated for 21 months with dilute acetic acid. These polysaccharides, isolated by various methods, details of which should be consulted in the original by those interested, were much more complex than those extracted from human strains.

All the carbohydrate fractions were tested by the precipitin reaction against a high titre serum. It was found that serological activity was associated with the extracts containing pentose. Serologically inactive carbohydrates, similar to those found in the human strain, were also encountered.—R. E. GLOVER.

SCHÄFER, W. (1939). Das Vorkommen des B. pseudotuberculosis rod. oder eines ihm ähnlichen Erregers bei Hühnerküken. **[Occurrence of** *Pasteurella*

pseudotuberculosis rodentium **in Chicks**].—*Tierärztl. Rdsch.* **45.** 72-73. [12 refs.]

B. describes cases of *Pasteurella pseudotuberculosis* infection in chicks in Germany, where it had previously been diagnosed in turkeys, but never before in fowls. He cultivated the organisms from the heart blood, liver and bone-marrow of two 14-day-old Leghorn chicks, which on autopsy showed catarrhal inflammation of the duodenum. The two strains so isolated were inoculated into g. pigs and rabbits in which typical lesions of the infection were found P.M. The biochemical reactions of the isolated strains are described. The organism was strongly agglutinated by a stock antiserum prepared in hares.—SASSENHOFF (MUNICH).

SHOOK, W. B., & BUNYEA, H. (1939). **The Detection of Carriers of Fowl Cholera, and Its Control, by Means of a Stained-Antigen, Rapid Whole-Blood Test.**—*Poult. Sci.* **18.** 146-149. [11 refs.]

A chronic form of fowl cholera occurred in a flock of fowls, and reappeared after a season, probably due to the presence of carriers of infection. In all, 478 birds were autopsied and fowl cholera was diagnosed culturally in 358. The organism isolated was pathogenic for rabbits, but failed to kill fowls when experimentally inoculated. The disease was successfully controlled by the application of a rapid whole blood agglutination test similar to that used in pullorum disease, with an antigen containing 0·01 % crystal violet.

Swollen wattles were noticed in some of the birds. Different methods of diagnosis of fowl cholera are discussed.—S. G. IYER.

I. LERCHE. (1939). Epidemiologie der Breslaubakterien. Ergebnis vierjähriger Forschung. [**Epidemiology of Salmonella Infections**].—*Dtsch. tierärztl. Wschr.* **47.** 225-226.

II. LERCHE. (1939). Typen der Breslau-Bakterien. [**Types of** *Salmonella typhi-murium*].—*Tierärztl. Rdsch.* **45.** 377.

I. The question of the epidemiology of salmonella infections, especially those outbreaks of disease associated with *Salmonella typhi-murium*, is reviewed. This organism is wide-spread and according to the author exists in horses, cattle, sheep, pigs, dogs, cats, geese, ducks, turkeys, pigeons, parrots, canaries, and the laboratory animals, mice and g. pigs. [Fowls are mentioned as resistant, yet they are occasionally infected, and the inclusion of dogs and cats is a little doubtful at the moment.] It is considered that nearly half of such farm animals as horses, cows and pigs as well as aquatic birds may show signs of infection. [Presumably by serological means, which is hardly conclusive in all cases.] It is pointed out that calves may remain infective for a long time and that horses may excrete the organism not only in the faeces but also in the urine. Pigs may harbour the organism during life and show no sign, whilst geese may also act as carriers. The extent and the time over which different species of animals may act as carriers of salmonella is shown to vary. Infection may spread not only between animals of the same species but also between animals of different species, so that a pigeon strain may infect other species and infect pigeons again and an intermediate animal may show no sign of infection, and yet be a carrier of the bacillus. The time during which *S. typhi-murium* may remain alive outside the body varies according to the moisture, temperature and type of substrate. According to L. it may remain alive in moist earth for 12 months and in dry for 16 months. There is no indication of the actual conditions of the experiments made, but it is noted that sun and light have a deleterious affect on the bacteria and that they do not

live so long in water. Corn and feeding stuffs may become infected with the faeces of mice and pigeons, and of 6,799 mice examined about 0·12% were positive for salmonella. Mention is made of the infection of duck eggs, mainly from the duck itself, and also of the eggs of sea-gulls which should be cooked for 10-15 minutes before consumption.

II. *S. typhi-murium* may be subdivided by its enzymic activities, such as the splitting of rhamnose, ammonium and inosite, and the fermentation of d-tartrate, and also by its antigenic variation, particularly as to its possession of the O antigens IV and V or IV alone. It has been stressed by some that the animal origin of a strain may be determined by these tests. Of 839 strains, all fermented arabinose, dulcite and xylose whilst 7% failed to split rhamnose. These latter were largely from domestic animals, with the exception of some from pheasants, duck eggs and also man. 7·6% were ammonium-negative and were mostly from pigeons, pheasants and other birds, although 60% from pigeons were ammonium-positive. Strains which are rhamnose-negative are usually ammonium-positive. The antigenic variant which contains the O antigen IV only was usually ammonium-negative and 78% of pigeon strains, 100% of pheasant strains and 40% of horse strains were of this type. As different types may occur in different animal species, and because of the great number and variety of salmonella, L. concludes that epidemiological features are at present the main key to this problem.—R. Lovell.

Morgan, H. R., & Beckwith, T. D. (1939). **Immunological Relationships of Polysaccharides of Mucoid Organisms of the Typhoid-Salmonella Group.** —*J. Bact.* **37.** 389-399. 4 tables. [17 refs.]

Mucoid cultures of the following salmonella were obtained, *S. typhi*, *S. paratyphi* A, *S. paratyphi* B, *S. paratyphi* C, *S. typhi-murium*, *S. enteritidis*, *S. pullorum* and *S. cholerae-suis*. Polysaccharides were extracted from them by shaking suspensions and precipitation of the supernatant with sodium acetate and four volumes of alcohol. Antisera were prepared in rabbits by injection of suspensions of bacteria and in another series by injection of the polysaccharide. The polysaccharides were antigenic and are considered to have some of the same characteristics as the antigenic extracts of other workers; some of these are polysaccharide-lipoid complexes. The intradermal injection of the polysaccharide in normal or immune rabbits leads to the formation of sterile abscesses.

Sera produced by both methods were used for agglutination and precipitation reactions, and the results were parallel, *i.e.* the results were in accord with the antigenic classification of the bacteria concerned. For example, the cross reactions (both agglutination and precipitation) of *S. typhi*, *S. enteritidis* and *S. pullorum* were to be expected because of the possession of a common O antigen. The same applies to *S. typhi-murium* and *S. paratyphi* B, and the cross-reaction between *S. typhi* and *S. paratyphi* B is accounted for by the common possession of the accessory O antigen XII. Cross-reactions between *S. typhi* and *S. paratyphi* A could not be accounted for on the basis of a common identified O antigen.

The results indicated that the polysaccharide, although free from demonstrable intact protein, is antigenic and that it contains all the O antigenic factors shown in the Kauffmann-White scheme of classification.—R. Lovell.

Cruickshank, J. C. (1939). **Somatic and " X " Agglutinins to the Salmonella Group.**—*J. Hyg., Camb.* **39.** 224-237. 10 tables. [Numerous refs.]

It is known that there may be cross-relationships between certain members of the salmonella group which are probably due to the possession of minor somatic antigens not always present. These relationships have been noted particularly

in human sera, and especially between *Salmonella typhi* and *S. paratyphi* B. Another factor which may have a bearing is the " X " antigen. This antigen appears to be developed by most, if not all, salmonellas, especially if grown in broth at 37°C. for several days or on solid medium which is moist. The antigen is not specific; it is thermostable and not affected by 0·25% formalin. " X " agglutination resembles the granular somatic type, but the flakes are slightly coarser.

A study of the somatic agglutinins for a number of salmonella present in the sera of human beings was made in order to throw more light on the above problems, especially with regard to the interpretation of the diagnostic agglutination test. In a number of Wassermann sera tested, agglutinins to the somatic antigens were rare except to *S. typhi* and to *S. paratyphi* B. The sera of enteric cases mostly contained these agglutinins and there was an almost constant relationship between these two. Consequently it is advocated that both O suspensions should be used in the investigation of suspected cases of enteric fever. There were other cross-relationships but it is concluded that in all cases this is due to the common possession of minor antigenic factors. For example, a factor XII has been designated as common to *S. typhi* and *S. paratyphi* B, and there is some doubt as to its diagnostic significance. C. is of the opinion that it should be retained as a factor common to those two bacteria as well as *S. typhi-murium* and *S. enteritidis*. There was no evidence that the " X " antigen is responsible for the cross-relations which existed, but to avoid confusion it is essential that salmonella suspensions used for diagnostic work should not contain " X " antigen. An " X " serum for testing purposes may be prepared by immunizing a rabbit with a suspension or filtrate of a salmonella grown in broth for two to three days at 37°C. and steamed for half an hour.

There was no evidence of increased frequency of salmonella agglutinins in the sera of tuberculous patients.—R. Lovell.

Edwards, P. R. (1938). **The Occurrence of Salmonella Newport in Domestic Animals.**—*J. Amer. vet. med. Ass.* **93.** 192-193. [5 refs.]

Salmonella newport is accepted as a cause of " food poisoning " in man, but little is known of its distribution in animals, although there is a record of its isolation from pigs. E. examined four cultures which were recovered from the following sources :– (a) the spleen of a pig with necrotic enteritis, (b) the intestinal contents of a steer affected with haemorrhagic enteritis, (c) the intestine of a hen with tapeworms and enteritis, and (d) the intestine of a pullet from a flock in which birds were dying with no previous symptoms of illness. All the cultures were by antigenic analysis shown to be *S. newport* and this is believed to be the first record of its isolation in U.S.A. *S. senftenberg* was isolated from the last case as well as *S. newport*.—R. Lovell.

I. Németh, I. (1938). Adatok a baromfityphus és a baromfigümőkór alterjedtségéhez a népies tenyésztésben. **[Fowl Typhoid and Fowl TB. on Small Holdings]**.—*Thesis, Budapest.* pp. 9. 2 tables. [10 refs.] [German summary].

II. Törzsök, P. (1937). Adatok a baromfityphus elterjedtségéhez a népies tenyésztésben. **[Incidence of Fowl Typhoid on Small Holdings]**.—*Thesis, Budapest.* pp. 15. 1 fig., 1 table. [9 refs.] [German summary].

I. Agglutination tests and intradermal tuberculin tests were carried out on 174 flocks in a district. 81 farms (46%) were found to be infected with fowl typhoid; on these farms, 210 out of 3,325 hens, 2 out of 89 guinea hens, and 1

out of 65 turkeys gave positive reactions. The incidence of infection varied between 1% and 50%. Heavy losses in young chicks were found only in those flocks in which the incidence was over 10%.

TB. was found in 79 farms (45%); out of 3,318 hens, 136 gave a positive reaction, while in guinea hens and turkeys all results were negative. The incidence of TB. varied between 1% and 100% for a single farm. [Continental authors do not always differentiate between *Salmonella gallinarum* and *S. pullorum*; the author is possibly speaking of the two infections as if they were one.]

II. The agglutination test was carried out on 45 small flocks from one district to detect carriers of fowl typhoid. Out of 2,941 birds 213 (7%) were found to be infected, while 22 guinea hens, 19 turkey hens, 21 ducks and 5 geese gave a negative reaction. Out of these 45 flocks only 5 were found to be free of infection, while the incidence in the other flocks was 1-3% in 4, 3-8% in 21, and 8-18% in 15. The investigation showed that laying and reproduction were satisfactory only in those flocks which were free from infection, or only slightly infected (1-3%). [See note in I.]—G. SÁLYI (BUDAPEST).

GARSIDE, J. S. (1939). **Salmonella Infections of Ducks and Ducklings.**—*Harper Adams Util. Poult. J.* **24.** 409-414. [10 refs.]

A general description is given of the occurrence of salmonella infections in ducks and ducklings. *Salmonella typhi-murium* and *Salmonella enteritidis* are of greatest importance in the British Isles. Transmission in nature is usually by ingestion of infective material by the birds after hatching. The disease may be egg-borne, the breeding stock serving as the reservoir of infection. The possibility that other poultry, rats and mice, or cows and calves may disseminate infection either by harbouring or carrying the organisms, is discussed. Control measures such as tracing the source of infection, efficient hygiene, elimination of vermin and repeated agglutination testing of all adult ducks and other poultry against the relevant antigens, are suggested.

The danger of food poisoning to human beings from the use of infected eggs is emphasized, and references to this subject from literature are cited.—S. G. IYER.

—. (1939). **Report of the Special Committee on Bang's Disease [Amer. Vet. Med. Ass.].**—*J. Amer. vet. med. Ass.* **94.** 325-330.

A number of recommendations for the control of brucella infection are made. They include proposals to set up a new Bureau of Animal Industry laboratory for the production and distribution of standard brucella antigen. The proposals also include arrangements to tag and quarantine reactors; to ensure the reporting of all agglutination tests to State authorities; to exercise rigid official control of brucella vaccines; to educate the owners of herds; to test infected herds frequently; to ensure that additions to herds are made from uninfected sources; to stipulate that all animals exhibited at shows must have been tested previously within 60 days; to formulate uniform regulations governing interstate movement; to intensify calfhood vaccination research; to test all breeding or dairy cattle before exposure in public markets; to disinfect vehicles used for transport of infected stock, and to resort to area testing whenever a substantial majority of cattle-owners signify their desire for such testing.

During the year, interest in the "area plan" of control was sustained, and approximately 1,750,000 cattle were tested in 250 counties. Calfhood vaccination studies were continued in 290 badly infected herds, but no observations have been made on their results.—D. D. OGILVIE.

FITCH, C. P., BOYD, W. L., & BISHOP, Lucille M. (1939). **Studies on Saliva and Salivary Glands for the Presence of Brucella Abortus.**—*Cornell Vet.* **29.** 338-340. [4 refs.] [Authors' summary copied *verbatim*].

In all, 134 samples of saliva from 39 reacting cattle have been studied. Cultures were negative on all these samples. *Brucella abortus* was isolated from one sample by g. pig inoculation. This cow had calved 11 days before and was sold shortly after the sample was taken, so there was no opportunity to obtain other samples. The possibility that the saliva was contaminated from outside sources cannot be disregarded, since the placenta of this animal was infected and the vaginal discharges were probably still infective 11 days after calving.

The submaxillary and parotid glands from 36 animals were examined. *Brucella abortus* was not found on any examination, either by culture or g. pig inoculation.

TAYLOR, A. W. (1939). **A Note on the Occurrence of *Br. abortus* Agglutinins in Farm Horses in the East of Scotland.**—*J. comp. Path.* **52.** 140-143. 3 tables. [12 refs.] [Author's summary copied *verbatim*].

The sera of 957 horses from agricultural districts in the East of Scotland have been examined by the tube test for agglutinins for *Br. abortus*.

769 gave a negative reaction to the test. Agglutinins were detected in 188 or 19·6% in a serum dilution of 1/10, 21 or 2·1% in a serum dilution of 1/20, and 1·9% in a serum dilution of 1/40 or more.

If those which showed the presence of agglutinins in a serum dilution of 1/10 are classed as negative, it would appear that neither sex nor age have a statistically significant influence upon the agglutination titre.

DOYLE, T. M. (1939). *Brucella abortus* **Infection of Goats.**—*J. comp. Path.* **58.** 89-115. 9 tables. [Numerous refs.] [Author's summary copied *verbatim*].

Forty-eight goats were tested for susceptibility by conjunctival infection with measured doses of *Br. abortus*. Twelve goats carried their kids to term and 36 aborted (75%).

Sixty-three blood cultures were made from 40 goats artificially infected with *Br. abortus* and three positive results were obtained. This finding is in marked contrast with the high percentage of positive blood cultures obtained from goats infected with *Br. melitensis*.

Two experiments were carried out in which pregnant goats were placed in contact with goats recently aborted. The pregnant goats kidded normally, but three showed agglutination titres after kidding and *Br. abortus* was isolated from the foetal membranes of two of them.

The tissues of eleven artificially infected goats were examined at varying periods after infection for the presence of *Br. abortus*. The organism was recovered from five animals 113, 128, 182, 241 and 386 days respectively after infection.

Br. abortus was still present in the milk of four goats 114, 216, 259 and 386 days after infection.

Two strains of *Br. abortus*, of bovine origin, were subjected to serial passage in goats and tested subsequently for pathogenicity on in-calf heifers and guinea-pigs. There was no marked change in the pathogenicity of the strains as the result of passage through goats.

The two original strains, " Hylan " and " Poppy ", and the passage strains isolated from the goats were examined simultaneously for the production of H_2S and for dye sensitivity, but there was no appreciable difference in the results obtained.

PENSO, G. (1938). Epidemia familiare, im ambiente cittadina, da Brucella abortus bovis. [**Epidemic of Human** *Br. abortus* **Infection in Rome**].—*R. C. Ist sanità pubbl., Roma.* **1.** 847-852.

This is a case record of *Br. abortus* transmitted by milk to a family of four in Rome. Diagnosis was made by the blood agglutination test and by culture on Huddleson's medium.

MILES, A. A. (1939). **The Antigenic Surface of Smooth** *Brucella abortus* **and** *melitensis*.—*Brit. J. exp. Path.* **20.** 63-82. 12 figs., 2 tables. [Num. refs.]

Analysis of the agglutinin response of the rabbit to smooth strains of *Br. abortus* and *Br. melitensis* demonstrated that it was extremely variable and could be predicted only in terms of whole bacteria, *i.e.* mixtures of hypothetical major *Br.a.* and *Br.m.* antigens. The problem of describing two hypothetical antibodies in terms of two hypothetical antigens was solved to some extent by a study illustrated in nine figures of the particulation time curves of the various systems, obtained by plotting graphs of the logarithms of the serum dilutions against the time before complete precipitation in that particular dilution. M. considered that although the picture presented by his results was consistent, it could not be substantiated until the major *Br.a.* and *Br.m.* antigens had been isolated as separate substances in the pure state. The absorption of monospecific sera by homologous and heterologous suspensions of brucella strains was employed to estimate the ratio of major *Br.a.* antigen to major *Br.m.* antigen on the bacterial surface, and should facilitate the antigenic definition of the serological subspecies in the brucella group. The surface of the smooth strains of *Br.a.* and *Br.m.* studied by this method was found to comprise at least two antigens one of which was present in proportions varying from 1:40 in *Br.m.* to 1:10 in *Br.a* strains. The probable agglutinin response in the rabbit to a mixture of major *Br.a.*, major *Br.m.* and rough antigens was stated to be, firstly, the formation of antibodies with receptors to the major smooth antigen, and secondly, antibodies with receptors for both major and minor smooth antigens, and antibodies to the rough antigen. Absorption by small doses of heterologous organisms left monospecific sera containing only antibodies to the major smooth antigen. Such sera obeyed the hypothetical laws of specific antigen-antibody flocculation.—R. O. MUIR.

MILES, A. A., & PIRIE, N. W. (1939). **The Properties of Antigenic Preparations from** *Brucella melitensis* : **I. Chemical and Physical Properties of Bacterial Fractions. II. Serological Properties of the Antigens.**—*Brit. J. exp. Path.* **20.** 83-96 and 109-121. 5 tables. [Numerous refs.]

I. A routine test is described for detecting specifically precipitable soluble material (SSS) in extracted suspensions of a *Br. melitensis* strain. Details are also given of the preparation of bacterial suspensions for this purpose. Extraction of such suspensions, killed by chloroform, phenol or acetic acid, yielded four easily distinguishable fractions after the elimination of contaminating agar by repeated fractionation. These fractions were the SSS, a mixture of lipoids, nucleic acid and nucleoproteins. By different isolation methods, the SSS was shown to exist in two distinct states of complexity with similar but distinguishable chemical and physical properties. Batches of the same strain, for obscure reasons, differed chemically in the constituents of the bacterial cell. A technique is detailed for the isolation of SSS in its least modified form with a description of its physico-chemical properties. A detailed description is given of the preparation of the complete antigenic complex or " native antigen " to which the symbols " PLAPS " are applied as a rough indication of its chemical constitution—" PL " for phospho-

lipoid, " AP " for amino-polyhydroxy compound, and " S " for arginine-like substance. The process of antigenic disaggregation is described, by the addition of chloroform and sufficient acetic acid to raise the concentration to 25%. By various precipitation and centrifugation methods, a 5-10% yield of "AP" was obtained. Methods are given for the recovery of SSS in the aggregated or disaggregated state from supernatants after precipitation.

The degradation of " PLAPS " to "AP" was obtained by the removal of " PL" by acid-alcohol ether precipitation, and of the substance " S " by two or three precipitations with alcohol. The physical properties of " PL" and "AP" are summarized, together with the chemical characters of " PL", "AP" and " S".

II. The two states of aggregation in which the antigenic complex of *Br. melitensis* exists were distinguished by serological methods which were used to determine the relationship of various agglutinating and precipitating antigen-antibody systems in experiments on smooth antisera from 15 rabbits. A study was made of the serology, absorption, serological purification and disaggregation by sodium dodecyl sulphate of both antigenic complexes. The more highly dispersed complex—"AP" —was shown to contain the major antigens of *Br. abortus* and of *Br. melitensis*, while the more highly aggregated complex—" PLAPS "—appeared to contain antigenic determinants of rough *Br. melitensis* as well, although serological definition of the latter complex was rendered difficult by its physical heterogeneity and instability in solution. Its solutions showed anisotropy of flow, and the implied polarity of the component particles was paralleled by the formation of the orientated antigen-antibody complexes when solutions of the antigenic complex were mixed with some specimens of specific antiserum.—R. O. Muir.

Zagrodzki, K. (1938). Nowa metoda różnicowania szczepów R i S Brucella bovis drogą nieswoistego wypadania. Porównawcze badania proponowanej metody w stosunku do metod istniejacych. [**New Method for the Differentiation of R and S Strains of** *Brucella abortus* **by Non-Specific Agglutination**]. —*Pam. pańs. Inst. nauk. Gosp. wiej. Pulawy.* No. 2. pp. 14-22. 5 tables. [French version pp. 23-33]. [Suppl. to *Wiad. weteryn.* **18.** No. 223].

The work reported was subsidized by the Office Internationale des Epizooties and was carried out with the object of finding methods of differentiating S and R strains of brucella. The following methods were used and compared :– Burnet's thermo-agglutination, Michaelis' acid-agglutination, and Alessandrini and Pampana's trypaflavine-agglutination. Z. found that the latter was the best of the three for detecting R strains but none was effective if the proportion of R forms in the culture was less than about 30%. He accordingly experimented with other chemicals in place of trypaflavine and found that 0·2% rivanol was better and was capable of detecting R forms when present in a proportion of less than 10%. Chinosol and the hydrochloride or sulphate of quinine were also tested, but proved to be no better than trypaflavine.—V. Chládek (Prague).

Bordet, P. (1938). Facteurs de croissance et toxinogénèse. [**Growth Factors and Toxinogenesis**].—*Rapp. 1er Congr. int. Ass. Microbiol. Langue franç., 1938.* pp. 96-112. 2 tables. [Numerous refs.] [Also appeared in *Ann. Inst. Pasteur.* **61.** 618-634].

A review article which deals chiefly with the factors affecting toxin production by *Corynebacterium diphtheriae*. Some synthetic media support growth, but very little toxin is produced in them ; if, however, β alanine, pimelic acid and nicotinic acid are added, toxin production is greatly increased. It is owing to their high

cystine content that media made with Difco and de Witte peptone produce better toxin than do those made with other peptones. Cystine increases the growth of *C. diphtheriae*; histidine and arginine increase toxin production. The addition of yeast increases toxin production; this is due to the increased utilization of sugar and the oxidation of the acetate radicle which thus prevents the development of too great an acidity. Some of the properties of the active factor in yeast are described.

The effect of various sugars and the previous growth of *Bact. coli* in the medium followed by sterilization are discussed. The effect of various mineral salts on toxin production are described, and the factors affecting toxin production by *Clostridium tetani* and streptococci are briefly described.—JOHN FRANCIS.

LWOFF, A. (1938). Les facteurs de croissance pour les microorganismes. [**Growth Factors for Micro-Organisms**].—*Rapp. 1er Congr. int. Ass. Microbiol. Langue franç., 1938.* pp. 58-95. 23 tables. [Numerous refs.] [Also appeared in *Ann. Inst. Pasteur.* **61.** 580-617].

This is an extensive review article dealing with the growth factors for bacteria, protozoa and fungi. In many cases structural formulae are given and the effect of substituting various chemical groups is discussed. Within a certain range the action of growth factors is quantitative and the number of molecules required per organism can be calculated. The necessity for growth factors is said to be probably due to an organism losing the power to synthesize these substances, and bacterial symbiosis is discussed in this light.

Corynebacterium diphtheriae, *Staphylococcus aureus* and certain fungi require sulphur in a reduced form; other organisms can utilize sulphates as the sole source of S.

Factor X can be replaced by haematin but not by haematoporphyrin. Protoporphyrin, however, which has no peroxidase activity, is as active as haematin. The author considers that the presence or absence of activity depends on the molecular structure of the particular porphyrin concerned. Strains of *Haemophilus influenzae* when grown anaerobically do not require haematin. Factor V is related to the phospho-pyridine-nucleotides, to cozymase and to the co-ferment of Warburg. The whole molecule appears to be necessary and it acts as a catalyst to cell oxidation and perhaps to glycolysis. Nicotinic acid is essential for *Staphylococcus aureus* and certain varieties of dysentery bacilli and *B. proteus vulgaris*. Uracil ($C_4H_4O_2N_2$) is required for the anaerobic growth of *Staph. aureus*.

The relation of aneurin and of various pyrimidine and thiazol compounds to the growth of *Staph. aureus* and numerous other organisms is discussed in detail. Numerous organisms including the lactic and faecal streptococci require lactoflavine (vitamin B_2). Ascorbic acid and cholesterol are essential for certain protozoa. Pimelic acid is essential for some strains of *C. diphtheriae* and no other dibasic acid tested can replace it.—JOHN FRANCIS.

IPPOLITI, P. T. (1939). Ricerche sulla presenza di microorganismi nella cistifella di varie speci animali. [**Micro-Organisms in the Gall-Bladder of Various Animals**].—*Nuova Vet.* **17.** 122-127. [3 refs.]

The author examined bacteriologically the gall-bladders of various animals at the Bologna abattoir. A large variety of bacteria of low or no pathogenicity was found. Bacteria were present in the gall-bladders of 33·4% of lambs and kids, 35·2% of calves, 26·5% of swine, and 42·3% of adult cattle. The paper consists mainly of quotations from the literature.

WILLIAMS, J. W. (1938). **Effects of Surface Tension and Osmotic Pressure on the Gross Morphology of Certain Pathogenic Fungi.**—*J. Bact.* **35.** 409-414. 1 table. [6 refs.]

Some 30 species of pathogenic fungi were tested in various basal media to which agents for decreasing surface tension (sodium taurocholate, brilliant avirol L-124 or gardinol Ca) and for increasing osmotic pressure (calcium chloride or potassium iodide) were added. The various changes in colony characters, which may be due to physico-chemical factors, are tabulated. Lowering surface tension of Sabourand's glucose agar medium to that of a medium designated the " W " medium, containing 4% peptone and 1% glucose, gave only partial duplication of " W " medium morphology. Changes due to increased osmotic pressure could be explained merely by the decreased loss of moisture, when calcium chloride was added to a " W " medium.

Six species remained unaffected by both factors. Some species were rendered similar to other species in colony characters. This may point to close biological relationship.—C. V. WATKINS.

DISEASES CAUSED BY PROTOZOAN PARASITES

SOLDINI. (1938). Le diagnostic expérimental de la dourine. [**Experimental Diagnosis of Dourine**].—*Bull. Acad. vét. Fr.* **11.** 557-559.

S. recorded in 1929 that a small quantity of serous fluid, taken from the oedematous genitalia of animals affected with dourine, and inoculated into the testicle of a rabbit, produced an oedematous swelling in the fluid of which trypanosomes could be readily detected microscopically. It is now recorded that quantities of blood, varying from 0·5-1 c.c., from infected animals in which no oedema of the genitalia occurs, is equally satisfactory in producing a trypanosome infection of the testicle of the rabbit. The oedematous reaction of the rabbit's testicle usually commences five or six days after inoculation, but in one case it was delayed till the 15th day. [The predilection of *Tryp. equiperdum* for the testicle of the rabbit was recorded by UHLENHUTH and EMMERICH.—(1913). *Deutsch. med. Wschr.* **39.** 642.—and they suggested intratesticular inoculation of rabbits as a method of demonstrating equine infection].—U. F. RICHARDSON.

HORNER, I. (1939). **Studies on Serum Complement of Guinea Pigs Infected with Trypanosoma equiperdum.**—*J. Immunol.* **37.** 85-90. 2 tables. [Extract from author's summary].

The complementary titre of the serum of trypanosome-infected guinea-pigs was repeatedly observed during the course of the disease. It was found that, while the trypanosomes were numerous or were accumulating in the blood, the complement remained stationary up to the peak of this period of multiplication. With the subsequent disappearance of the trypanosomes from the blood, the complement content dropped to one third or one quarter of its previous normal value, returning in the next days to the normal level, where it remained throughout the next cycle of multiplication of trypanosomes. This cycle of depletion of complement and return to the normal level recurs simultaneously with each phase of disappearance of trypanosomes from the blood.

The loss of complement seems due to an " *in vivo* " antigen-antibody reaction, pointing to the existence of a trypanolytic antibody.

TORRES, S., & RAMOS, J. I. (1938). Eimerias dos caprinos e ovinos em Pernambuco. [**Eimeria Infection of Goats and Sheep in Pernambuco**].—*Bol. Soc. brasil. Med. vet.* **8.** 256-269. 5 tables. [8 refs.] [English summary].

Eimera faurei was recorded in Brazil for the first time by the authors. Besides this *E. arloingi*, *E. galouzoi* and *E. ninae-kohl-yakimovi* were also found.—A. H. H.

CLAUSSEN, L. (1939). Ueber Darmkokzidiose beim Geflügel. [**Coccidiosis of the Intestine of Fowls**].—*Dtsch. tierärztl. Wschr.* **47.** 356-357. 3 figs. [1 ref.]

The principal features of the life-history of *Eimeria tenella* and descriptions of original histological examinations are contained in this paper. We know that large numbers of merozoites are found in the blood contents of the caeca during the acute phases of the disease, and that schizogony always occurs in the glandular epithelium. In his study of sections of the caecal wall C. has found that the small schizonts are found in the glandular epithelium and that the large schizonts are contained in the interstitial connective tissues of the mucous membranes.—C. H. S.

JOHNSON, W. T. (1938). **Coccidiosis of the Chicken with Special Reference to Species.**—*Sta. Bull. Ore. agric. Exp. Sta.* No. 358. pp. 33. 15 figs., 6 tables. [Numerous refs.]

This posthumous paper [written by Mrs. W. T. Johnson from her husband's rough notes] opens with descriptions of the six species of coccidia found in fowls. It affords further refutation of the belief that unsporulated oocysts are infective, but it confirms the view that experimental inoculation can produce a condition of immunity, or a high degree of resistance, against the species inoculated. Under experimental conditions birds were successfully immunized against five species of coccidia. Other matters dealt with in some detail are cross-immunity, self-limitation of life-cycle, chronic coccidiosis, symptoms and lesions, and control [briefly]. [There is little new material, and the results are largely confirmatory, or throw some fresh light on the author's earlier work].—C. HORTON SMITH.

I. YAKIMOFF, W., & MATSCHOULSKY, S. N. (1937). Nouvelle coccidie du faisan. [*E. langeroni* **n. sp., a New Parasite of the Pheasant**].—*Ann. Parasit. hum. comp.* **15.** 162-163. 1 fig.

II. YAKIMOFF, W., & MATSCHOULSKY, S. N. (1939). A propos d'une coccidie du faisan. [**A Coccidium of Pheasants**].—*Bull. Soc. Path. exot.* **32.** 280-283. 1 fig., 1 table. [4 refs.]

I. A small number of coccidial oocysts were found in the faeces of two pheasants, *Phasianus chrysomelas*. These oocysts were oval or slightly elongate in shape. After culture it was noted that the sporozoites were extremely large. The evidence for regarding these oocysts as belonging to a new species is not based only on their dimensions and cell-characters, but also upon the degree of host-specificity. *Eimeria phasiani* proved infective when it was fed to six pheasants, but failed to infect eight chickens, three turkeys and four quails. [One assumes that the dosages to each of these birds were of equal value, but there is no indication of this, or of the number of oocysts fed].

II. Once again a new species of coccidium is reported from Russia, and once again specific characters are based entirely upon the oocyst. In this instance the description of the oocyst shows marked differences from the other pheasant coccidium, the large form *Eimeria langeroni* from *Phasianus chrysomelas* [see I above]. There is however a close similarity between the oocysts of this new species and those of *E. phasiani* described in 1929 by TYZZER from *Phasianus*

colchicum torquatus. The new species was obtained from the faeces of a pheasant [species unknown] from the zoological gardens of Kharkoff. The dimensions approximate very closely to *E. phasiani*, but the oocyst is round and not elongate, both species have no micropyle and no residual body, and both possess a polar granule. [Further investigation and comparisons of the life-histories will no doubt be undertaken before the newly-observed coccidium is finally promoted to specific rank ; of course it would be both valuable and essential to determine the species of the pheasant host].—C. Horton Smith.

Ivanić, M. (1938). Razorački parazitski rad i multipla deoba (shizogonija) jedne levkocitozoe, *Leucocytozoon galli* Ivanic, u celijama slezine domače kokoši, *Gallus domesticus* L. [*L.g.* **and the Changes It Causes in the Spleen of Fowls During Schizogony**].—*Arhiv. Minist. Poljopriv., Belgrade.* **5.** No. 10. 15-54. 38 figs. on 2 plates. [Numerous refs.] [German summary].

L.g. enters the parenchyma cells of the spleen of the common fowl as a small, immature body, either ring-shaped, pear-shaped, or in flagellate form, and attacks either the protoplasm or the nucleus, causing histolysis. Multiplication takes place either by budding or by schizogony. Both white and red cells in the spleen are attacked and digested by the parasite. Destruction goes on both intra- and extracellularly, thus showing Reichenow's opinion [(1927). *Lehrbuch der Protozoenkunde.* Jena : Gustav Fischer.] as to the harmlessness of this parasite to be incorrect.—B. Oswald (Križevci).

Johnson, E. P., Underhill, G. W., Cox, J. A., & Threlkeld, W. L. (1938). **A Blood Protozoon of Turkeys Transmitted by** *Simulium nigroparvum* **(Twinn).** —*Amer. J. Hyg.* **27.** 649-665. 18 figs. on 3 plates. [13 refs.]

The authors describe a disease of turkeys, with a mortality of about 30%, which occurs in Virginia in August and September. The condition resembles that due to *Leucocytozoon smithi* infection, and in this case also a *Leucocytozoon* was encountered. The parasites were transmitted by *Simulium nigroparvum*, and development stages described as zygote, ookinete, oocyst and sporozoite were detected in the stomach, malphigian tubules and salivary glands of the *Simulium*. —U. F. Richardson.

I. Chorine, V. (1938). Modifications sériques chez les poules au cours de l'infection due au *Plasmodium gallinaceum*. [**Serum Changes in Fowls Infected with** *Pl. gallinaceum*].—*C. R. Soc. Biol. Paris.* **127.** 1189-1191.

II. Coggeshall, L. T. (1938). *Plasmodium lophurae*, **A New Species of Malaria Parasite Pathogenic for the Domestic Fowl.**—*Amer. J. Hyg.* **27.** 615-618. 9 figs. on 1 plate. [2 refs.]

I. C. examined changes in the serum composition of fowls during malarial infection, and found that there was only a short variation in the euglobulin content, but that the pseudoglobulin content might increase in the early stages of infection. The molecular concentration varied very slightly from normal. The serum changes in malaria of fowls are not comparable to those which occur in human malaria.

II. The author records the successful inoculation of fowls with a malarial parasite from a Borneo fireback pheasant. The parasite differs from *Plasmodium gallinaceum* in that the schizont divides into only half the number of merozoites, and that infection only produces a moderately severe disease which does not end fatally.—U. F. Richardson.

JENSEN, B. H. (1938). Om Leptospirainfektioner. [**Leptospirosis**].—*Maanedsskr. Dyrlaeg.* **50.** 177-189 and 204-210. 2 tables. [12 refs.]

Examination of 208 sera from dogs suspected of leptospirosis showed that specific antibodies corresponding to *L. canicola* or *L. icterohaemorrhagiae* were present in 70 and 33 of the samples respectively. Six samples gave positive reactions to both antigens. *L. canicola* infection is predominant among dogs living in Copenhagen, whereas *L. icterohaemorrhagiae* infection seems to predominate in the country districts. Rats caught at Copenhagen are often found to be excretors of spirochaetes. In five out of twenty horses which were imported from Poland, the blood was lytic for *L. icterohaemorrhagiae*. The immunological behaviour of twelve strains of leptospira at the Serum laboratory, Copenhagen, is described.

—H. C. BENDIXEN (COPENHAGEN).

I. WIRTH, D. (1939). Ergebnisse neuerer Untersuchungen über die Leptospirosen der Hunde. [**New Discoveries Concerning Canine Leptospirosis**]. —*Wien. tierärztl. Mschr.* **26.** 353-364. [Numerous refs.]

II. PROKOPANOFF, A. (1939). Ein Beitrag zur Leptospiren-Infektion des Hundes. [**Leptospiral Infection in Dogs**].—*Tierärztl. Rdsch.* **45.** 465-467. 2 tables. [Numerous refs.]

I. Leptospirosis presents a variety of clinical pictures, *viz*, acute jaundice, acute illness without jaundice (Stuttgart disease), chronic uraemia, transient polyuria, and a subclinical form (" leptospiruria "). Acute uraemia may develop in chronic and subclinical cases.

W. succeeded in producing many of these forms of the disease in transmission experiments. Inoculation of pups with material from natural cases of Stuttgart disease resulted in 54 successful transmissions out of 80. 29 succumbed to acute illness (28 with icterus), the incubation period being usually from 8-12 days. In 24 cases the animals appeared healthy for a variable period after inoculation (1-7 months), but then died suddenly without symptoms or after a short illness with icterus. One case recovered from icterus, which developed after 8 days, but died after a short illness a few weeks later.

In some chronic experimental cases leptospira appeared in the urine after 11 days or so, and remained demonstrable for from 2-6 months. Polyuria was an early symptom, and the picture was typical of that seen in natural chronic cases. In such cases there is generally a chronic interstitial nephritis ; a " vacuolar degeneration " of the cortical epithelium is commonly noted, in many cases epithelial cells being swollen and obstructing the lumen of the tubule. Interference in function of the tubules results at first in polyuria and later in uraemia. Leptospira were demonstrable in kidney sections in eight out of ten cases in which no parasites could be found in the urine. The species *L. icterohaemorrhagiae* and *L. canicola* do not show clear-cut differences, and it is suggested they may be varieties of a single species. W. reviews recent work on leptospirosis and a valuable list of references is appended.

II. The observation by various authors of a subclinical form of Stuttgart disease, and the suggestion that leptospirosis is a common cause of kidney disease in dogs, led P. to conduct detailed examinations of 360 dogs under treatment for various conditions at a clinic. 112 dogs suffered from kidney affections and 27·6% of these gave positive reactions to serological tests against leptospira, as against 9·2% amongst those with healthy urinary organs. 15% of all animals at the clinic showed evidence of leptospiral infection, previous or existing, and 83·3% of these were males, only 16·6% being females. Living leptospira could be demonstrated in the urine of only five out of 48 reactors. Various strains from

human beings, dogs, and rats were employed in serological tests and the tabulated results illustrate the diversity of antigens of the strains used.—H. E. HARBOUR.

DISEASES CAUSED BY VIRUSES

URBAIN, A., BULLIER, P., & NOUVEL, J. (1938). Au sujet d'une petite épizootie de *Fièvre aphteuse* ayant sévi sur des animaux sauvages en captivité. [**An Outbreak of Foot and Mouth Disease in Wild Animals in Captivity**].—*Bull. Acad. vét. Fr.* **11.** 59-73. [5 refs.]

Out of 250 susceptible animals in the Paris Zoological Gardens, 32 were infected during an outbreak and four died. The symptoms encountered in the different species are described and the varying degrees of susceptibility are discussed. Immunization by serum-virus inoculation was carried out to a limited extent. Passive immunization was preferred and this, combined with isolation and adequate disinfection, limited the spread of the disease and the mortality.

All the animals affected were ungulates. The infection first appeared in Bovidae, with symptoms similar to those observed in domestic cattle. A "kouprey" (*Bos sauveli*), a gaur (*Bos gaurus*) and three buffaloes (two *Bos bubalis* and one Rumanian) recovered after treatment with antiserum and *pus aseptique*; a gayal (*Bos frontalis*) succumbed to the infection; three other Rumanian buffaloes and a number of African buffaloes (*Bos caffer*) were immunized with antiserum and remained well. Two American bison (*Bos bison*) were affected. Several varieties of deer and antelope received immune serum or citrated blood from a recovered animal; only a few developed symptoms and these were of a nervous character; one deer (*Dama dama L.*) succumbed. Sheep, goats and moufflons were given serum and remained well. Animals of the Suidae family were very susceptible; the babiroussas (*Babirussa babyrussa*) were affected and, after inoculation with antiserum and virus, four wild boars contracted the infection, one *Potamochoerus porcus* had a severe reaction and two out of four wart hogs (*Phacochoerus aethiopicus*) reacted. All recovered after treatment with antiserum. Four Tapiridae contracted the disease and recovered; pigs and tapirs had lesions confined mainly to the feet. Two guibs (*Tragelaphus scriptus*) died, one after double inoculation and one untreated. Dromedaries, camels, llamas and alpacas were immunized with antiserum and remained well; giraffes and hippopotamuses were not immunized and were not affected.—F. H. MANLEY.

I. LARRE. (1938). Essai de vaccination contre la fièvre aphteuse. [**Vaccination against Foot and Mouth Disease**].—*Bull. Acad. vét. Fr.* **11.** 554-555.

II. VERGE, J. (1938). Immunisation active contre la fièvre aphteuse. [**Active Immunization against Foot and Mouth Disease**].—*Rev. Path. comp.* **38.** 1354-1358.

III. CHRÉTIEN, M., & THIERY, M. (1939). L'hémoprévention contre la fièvre aphteuse dans le départment de la Seine et dans quelques exploitations de la région parisienne. [**Use of Convalescent Serum in Outbreaks of Foot and Mouth Disease in the Seine Department and the Neighbourhood of Paris**].—*Bull. Acad. vét. Fr.* **12.** 49-59. 2 figs., 2 tables.

IV. LAMARRE, L. (1939). Hémoprévention anti-aphteuse par transfusion de sang de convalescent. [**Prophylaxis of Foot and Mouth Disease by Transfusions of Convalescent Blood**].—*Rec. Méd. vét.* **115.** 12-41. 6 tables. [14 refs.]

I. L. describes an attempt at vaccination against F. & M. disease in Algeria

with scrapings of the buccal mucous membrane, at the stage when vesicles are present, suspended in 4% aqueous solution of bismuth subnitrate. Eight animals were injected (intraderm.) with 1 c.c. doses. Six days later these and 592 other animals were exposed to natural infection. The treated animals showed first symptoms at the 28th day, whereas the untreated animals tended to develop vesicles in 24-48 hours.

II. The author discusses WALDMANN's technique of vaccination against F. & M. disease [*V. B.* **9.** 17].

III. Convalescent blood treatment against F. & M. disease was applied to 540 cattle and 315 pigs. 2 c.c. per kg. for adults and 3 c.c. per kg. for young cattle were injected (subcut.) in 3 or 4 sites, those animals most remote from contact with infection being treated first. The blood was obtained from adult animals in the stage of recovery—between 12 and 20 days after infection, 3 or 4 litres of blood being taken from each animal. The blood was citrated (5:1,000) and " Sunoxol " was added (1·3:1,000) and it was kept in cold storage.

A loss of only about 5-10% of milk yield occurred in herds treated within 24-48 hours of the outbreak. No mortality followed treatment; 35% developed a mild form of the disease, and 1% a severe form.

IV. Blood was collected from 11-18 days after the onset of symptoms. Only type O virus was found in France during this outbreak, so it was assumed that convalescent blood would provide the correct specific antiserum. Blood was not collected from herds in which tuberculosis, brucellosis, piroplasmosis or Johne's disease were known to exist. The apparatus, technique and the method of citration for the collection of blood is detailed, the blood being held at body temperature for three hours at most until used. Dosage varied from 350-500 c.c. per adult intravenously and up to 700 c.c. in severe outbreaks. Mixtures of more than four donors' blood could not be made, but as far as possible mixtures were made of the blood of four donors though in some instances the blood was from a single donor. The dangers of using the blood of a single donor (iso-agglutination and haemolysis) are emphasized. [PANISSET—(1922) *Rev. gén. Méd. vét.* **31.** 441.—demonstrated the danger of indiscriminate direct transfusion in cattle].

Complications, generally benign and transitory, followed 37 out of 1,006 transfusions. Cardio-pulmonary cases (32) predominated and included one fatality. Protection was solid for 10 days and partial for 30 days. The practice of " haemo-contamination " (blood transfusion followed by natural infection) reduced the gravity of the outbreak and mortality, the animals so treated later acting as blood donors. " Haemo-vaccination " was used in 271 cases, 5-10 c.c. of infective blood being injected (subcut.) immediately after the transfusion, in infected herds only. The immunity resulting was more solid, but in comparison with other methods more cattle developed infection, the attacks, however, being mild.—C. V. WATKINS.

DAVESNE, M. (1937). Traitement de la fièvre aphteuse par le sérum des animaux convalescents de la maladie. [**Treatment of Foot and Mouth Disease with Convalescent Serum**].—*Bull. Soc. vét. prat. Fr.* **21.** 190-199, 205-213 and 230-238.

A report of a discussion upon the relative immunity derived from the use of convalescent serum and the direct transfusion of blood from a convalescent animal to the recipient, the inoculated animal then being exposed to infection to acquire active immunity.—E. C. HULSE.

I. PULLES, H. A. (1938). Reconvalescentenbloed bij mond- en klauwzeer. **[The Use of Convalescent Blood Combined with Active Infection in the Control of Foot and Mouth Disease]**.—*Tijdschr. Diergeneesk.* **65.** 1147-1156.

II. VAN DER VEEN, H. T. (1938). De toepassing van reconvalescentenbloed bij mond- en klauwzeer. **[Preparation of Convalescent Blood for Foot and Mouth Disease Control]**.—*Ibid.* 1266-1270.

I. A description of P.'s methods. Three litres of blood are drawn from the milk vein of each cow into enamel vessels containing sodium citrate ; the blood is passed through a cloth and a 6 litre injection syringe is used, the blood being used while it is still warm ; the dosage is 600-800 c.c. (subcut.). On the following day a cloth soaked with infected material is rubbed over the gums, palate and tongue.

II. V. collected convalescent blood from cows 12-14 days after the occurrence of the first symptoms of F. & M. disease ; he kept the citrated blood on ice when necessary. He advocates a dose of 800-1,000 c.c. for adults, 200 c.c. for calves and 15-60 c.c. for pigs. Infection is set up as described in I. He considers the method of great value.—JAC. JANSEN (UTRECHT).

I. SAVAGE, A., & ISA, J. M. (1939). **Marsh's Disease [Condition Appearing After Use of Encephalomyelitis Antiserum]**.—*J. Amer. vet. med. Ass.* **94.** 431-432. [3 refs.]

II. SHAHAN, M. S., GILTNER, L. T., DAVIS, C. L., & HUFFMAN, W. T. (1939). **" Secondary " Disease Occurring Subsequent to Infectious Equine Encephalomyelitis**.—*Vet. Med.* **34.** 354-358. 1 fig., 2 tables. [9 refs.]

I. Horses injected with equine infectious encephalomyelitis serum as a preventative developed serious illness, this possibly having been caused by the serum [see footnote to II]. It was found that acidophile inclusion bodies were present in their livers. The bodies were spherical, and varied from 2-15μ in diameter. Usually they occurred singly in the liver cells. They resisted degeneration, and could be detected in a free state some time after the mother cells had disappeared. Their structure and significance have not been determined.

II. The disease described in I is dealt with. Clinically it is characterized by icterus, intestinal atony, anuria, and nervous symptoms varying from stupor to mania. Sometimes there is severe haemoglobinuria. The onset of most cases is gradual, but severe cases have a rapid course, and death may follow in 12-48 hours. As a rule recovery is prompt in those animals in which adequate intestinal evacuation can be obtained.

Autopsy reveals hepatitis with intense icterus and parenchymatous degeneration as constant features. Slight nephritis with parenchymatous degeneration and haemoglobinuria, congestion of the spleen, hyperaemia of the stomach and intestines, intramuscular haemorrhages, and slight increase in volume of the cerebrospinal fluid may also be present.

A number of cases of the disease occur in animals which have never received any biological product, and the actual cause of the condition is unknown. Attempts to produce the disease by inoculation from clinical or recovered cases have been unsuccessful, but one normal horse injected experimentally with encephalomyelitis antiserum developed mild, but apparently typical, symptoms of the disease. [See also *V. B.* **8.** 572, **9.** 540 and **9.** 871].—D. D. OGILVIE.

LAMONT, H. G., & KERR, W. R. (1939). **Aujeszky's Disease. (" Pseudo-Rabies ", " Infectious Bulbar Paralysis ", " Mad Itch ".) A Preliminary Note**.—*Vet. Rec.* **51.** 483.

Three cases of Aujeszky's disease in bullocks in Northern Ireland are described. Two of the animals developed intense head itch and died within 6-12 hours. The third animal became dull and had difficulty in rising. An itchy patch developed on the left side of the body, and death followed in about 24 hours. In addition to extensive injury to the areas of pruritus, autopsy revealed slight abomasitis with commencing ulceration. Emulsions of brain substance inoculated into rabbits in series produced local pruritus and death within a few days.—D. D. O.

SELVAGGI, F. (1938). Il problema della agalassia contagiosa negli ovini in Italia. **[Contagious Agalactia of Sheep in Italy]**.—*Azione vet.* **7.** 630-631. 1 fig.

An account of an outbreak in a flock of 400 sheep. No new facts about the disease are reported.

CARLSTRÖM, B., & HJÄRRE, A. (1939). Die Bedeutung der Fütterung als prädisponierenden Faktors bei der infektiösen Anämie. **[The Importance of Diet as a Predisposing Factor in Equine Infectious Anaemia]**.—*Rep. 13th int. vet. Congr. 1938.* **1.** 287-305. [In German: English, French and Italian summaries. Discussion pp. 315-318 in English, French and German].

Equine infectious anaemia is endemic in the province of Norrland, Sweden; the disease is associated with the poor quality of the grazing and fodder in this district. It had previously been shown that the grass which grows in the endemic regions is very rich in Mn and richest in those districts where the disease is most prevalent. Horses fed on such grass (MnO content 1 per 1,000) developed a condition which resembled that of the real equine infectious anaemia, but from which the disease could not be transmitted to healthy horses by blood inoculation.

It was thus apparent that two pathological entities were in evidence. Recovery from the nutritional anaemia followed the resumption of normal feeding. Horses were then given comparatively massive doses of Mn in their food continuously for some months, but abnormalities that resulted were not those associated with spontaneous cases of the disease. To ascertain if the Mn increased the susceptibility of the host to virus infection, three groups of horses were inoculated with the virus. In one group Mn was fed with normal hay, it was omitted from that fed to the second and in the third the Mn-rich hay from anaemia districts was fed alone. Resistance was lessened only in the last group. It was known, however, that the disease occurred on a farm where the hay contained no excess of Mn, but where on the other hand illness occurred which suggested a deficiency of vitamin B and which could be cured by yeast therapy. When horses were fed hay from anaemia districts the appearance of the disease was delayed if 50 g. of yeast were fed daily, and altogether prevented if 100 g. were fed.

In a further series of experiments, horses were inoculated with a weak anaemia virus after having been fed for 2½ months on Norrland hay, or with that hay and supplementary fodder devoid of vitamin B, or with hay and normal fodder. The normally fed horses remained healthy, those fed on Norrland hay alone had a mild infection, and those on vitamin deficient fodder contracted the disease in a severe form. It was evident that the addition of yeast in sufficient quantity to hay from anaemia districts protected against the disease caused by the forage alone and also afforded some protection against infection with the virus. The vitamin B content of finely-chopped normal hay remains constant for many months, but it quickly disappears in Norrland hay, presumably by oxidation due to the large amount of Mn present.—G. WILLIAMSON.

HORSFALL, F. L., Jr. (1939). **Neutralization of Epidemic Influenza Virus. The Linear Relationship between the Quantity of Serum and the Quantity of Virus Neutralized.**—*J. exp. Med.* **70.** 209-222. 4 text figs., 2 tables. [11 refs.] [Author's summary copied *verbatim*].

A linear relationship exists between the logarithm of the quantity of epidemic influenza virus neutralized and the logarithm of the quantity of antiserum which is capable of achieving this result. This relationship is the same for the serum of a ferret convalescent from experimental influenza as for the serum of a rabbit immunized with the virus. By means of the linear relationship between virus and antiserum it is possible to determine a fixed, rather than a relative, value for the neutralizing capacity of the serum.

WEBSTER, L. T. (1939). **A Mouse Test for Measuring the Immunizing Potency of Antirabies Vaccine.**—*J. exp. Med.* **70.** 87-106. 2 text figs., 13 tables. [5 refs.] [Author's summary copied *verbatim*].

1. A quantitative practical mouse test is described for measuring the immunizing potency of antirabies vaccines.

2. Virulent virus, injected intraperitoneally as a vaccine, immunized mice within 10 days and for a period of at least 9 months. Demonstrable neutralizing antibodies accompanied this immunity. Virus given subcutaneously failed to immunize as effectively. The margin between immunizing and infecting dose of vaccine was small.

3. Commercial vaccines containing virulent virus prepared for the treatment of man gave results similar to those obtained with laboratory virus.

4. Commercial vaccines inactivated with phenol and prepared for the treatment of man in general failed to immunize mice. None contained virulent virus. The phenolized preparation from one commercial firm, however, as also the chloroformized preparation from another, immunized mice consistently when given intraperitoneally in quantities approximating 5 times that advocated per gm. of body weight in man.

5. Commercial canine vaccines inactivated with phenol proved non-virulent and failed to immunize mice.

6. Commercial canine vaccines inactivated with chloroform (Kelser) proved non-virulent but capable of immunizing mice provided a single intraperitoneal injection of 2 to 5 times that prescribed for dogs per gm. of body weight was given.

7. Chloroformized vaccines proved irritative to the pertoneum of mice.

NELSON, J. B. (1939). **The Behaviour of Pox Viruses in the Respiratory Tract. II. The Response of Mice to the Nasal Instillation of Variola Virus.**—*J. exp. Med.* **70.** 107-115. 1 table. [6 refs.] [Author's summary copied *verbatim*]. [See also *V. B.* **9.** 316].

Variola virus was cultivated in embryonated eggs from smallpox crusts and maintained through 85 passages. Therein it produced foci of cellular proliferation and necrosis on the chorioallantoic membrane but did not affect the embryo.

The virus from egg cultures was inactive in the skin of the rabbit on primary injection and in the testis both initially and on passage. In the monkey it provoked a cutaneous eruption of short duration after an incubation period of 5 days.

On nasal instillation in the mouse the virus caused no symptoms and failed to survive on the mucous membrane of the upper air passages. Beginning with the 64th egg passage it was regularly recoverable from the lung, on subinoculation in eggs, through the 5th day and occasionally through the 7th day. Its presence in the lung was attended by progressive pathological changes.

KREMBS, J., & SEIFRIED, O. (1939). Auf Waschbären übertragbare Katzenseuche. (Ansteckende Kehlkopf- und Darmentizündung). [**Disease of Cats Transmissible to Racoons (Infectious Laryngo-Enteritis)**].—*Dtsch. Pelztierz.* **14.** 77-80. 3 figs., 2 tables. [3 refs.]

Infection with the virus of infectious feline laryngo-enteritis was diagnosed in racoons which died after they had fed with a sick cat. Three racoons died after four days' illness, during which they showed loss of appetite and dullness. On P.M. examination they showed thickening and reddening of the tonsils and the aryepiglottic fold and also thickening and a peculiar glassy appearance of the intestinal wall. In the intestines a diphtheritic membrane was also sometimes present and the intestinal lymph nodes were enlarged. The disease was transmitted to four cats from 2-8 years of age by nasal and oral instillation of 2 c.c. of organ extract.—SASSENHOFF (MUNICH).

CORONEL, A. B. (1939). **The Status of Philippine Avian Pest in the Past Ten Years.**—*Philipp. J. anim. Indust.* **6.** 43-54. 2 text figs., 1 plate, 3 tables. [7 refs.]

Fowl plague (Newcastle disease), which appeared in the Philippines in 1927, still continues to exist as sporadic outbreaks. C. records statistical observations made over a period of 10 years, on the epizootology of and experimental work on immunization. Various types of tissue vaccines and sera were tried with discouraging results. Calves were treated with fowl plague virus, and serum from one such calf was found to neutralize the virus *in vitro* and *in vivo*, but attempts to immunize chickens by inoculation of serum-neutralized virus, or by the simultaneous inoculation of the above serum and virus, were unsuccessful. C. leans to the view that there may be plurality of the virus.—S. G. IYER.

GUO, K. D. (1937). Ueber die Immunitätsbeziehungen zwischen dem Shope'schen Fibroma-Virus, dem Myxomatose-Virus und dem Neurolapine-Virus bei Kaninchen. [**Immunity Relations between the Shope Fibroma Virus, the Myxomatosis Virus and the Neurolapin (Pox) Virus in Rabbits**].—*Zbl. Bakt. I. (Orig.).* **139.** 308-314. [Numerous refs.]

Rabbits which had been inoculated cutaneously with neurolapin pox virus 12-47 days previously were inoculated with Shope's fibroma virus or with myxoma virus. In some cases these neurolapin-injected rabbits were injected, first with fibroma, and then later also with myxoma. The results showed that the neurolapin virus gave only a local skin immunity at the site of inoculation to the fibromatous strain of the fibroma virus, but that it provoked an immunity to skin infection with the inflammatory strain of fibroma. Immunological relationships between the neurolapin and myxoma, or between the fibroma and myxoma viruses, were not demonstrable.—SASSENHOFF (MUNICH).

FINDLAY, G. M., KLIENEBERGER, Emmy, MACCALLUM, F. O., & MACKENZIE, R. D. (1938). **Rolling Disease. New Syndrome in Mice Associated with a Pleuro-pneumonia-Like Organism.**—*Lancet.* **235.** 1511-1513. [3 refs.]

Three outbreaks of a new nervous disease in experimental mice are described with details of aetiology, pathology and clinical symptoms. During routine passage of the neurotropic viruses of yellow fever and lymphocytic chorio-meningitis in the brains of mice, certain mice developed nervous symptoms in 48 hours instead of in 4-5 days after intracerebral inoculation. About 10% of these mice showed a characteristic lateral rotation which gave the disease its title. Sections of affected brains revealed an intense polymorphonuclear leucocytic reaction and

staining by Giemsa's method demonstrated minute pleomorphic granules slightly larger than those of the vaccinia virus. The infective agent passed Berkefeld V filters, and collodion membranes with pores of 560 mμ but not those with pores of 490 mμ. It was successfully cultured on Klieneberger's special medium for the virus of pleuro-pneumonia and was inactivated by a temperature of 40°-45°C. for 30 minutes. The initial virulence for mice, lost after culture in artificial medium, was regained by rapid intracerebral passage in mice.—R. O. MUIR.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

LAAKE, E. W., & SMITH, C. L. (1938). **The Hydrogen-Ion Concentration of Myiotic Wounds in Sheep and Goats.**—*J. econ. Ent.* **31.** 441-443. 1 fig. [1 ref.]

The authors made pH determinations on exudates from experimental myiotic wounds in sheep and goats. The records at first follow the same course in both animals except that the changes occur sooner in goats. The alkalinity is comparatively high (pH 7·4) from the 3rd to the 6th day; this is important because it has been shown with g. pigs that high alkalinity is attractive to gravid females of *Cochliomyia americana*. In the post-myiotic period, the reaction of the wound in goats becomes increasingly acid as long as pus is present, whereas in sheep it is alkaline or neutral for the entire period. It is suggested that treatment should aim at acidifying the wound by either local or internal medication.—R. P. HOBSON.

ROBINSON, W., & BAKER, F. C. (1939). **The Enzyme Urease and the Occurrence of Ammonia in Maggot-Infested Wounds.**—*J. Parasit.* **25.** 149-155. 3 tables. [Numerous refs.]

Ammonia, present in the excretion of maggots, accounts for the alkalinity of infested wounds. The ammonia may be produced by the maggots themselves or by bacteria present in their alimentary tracts. Another source of ammonia, however, is the breakdown of urea by the enzyme urease, resulting in the production of ammonium carbonate. Urease was demonstrated in macerated prepupae of *Lucilia sericata*, and also in their excretions. Aseptic maggots of this species were also found to contain urease, but in considerably less abundance than in the non-sterile maggots.—J. MACLEOD.

PARISH, H. E., & CUSHING, E. C. (1938). **Locations for Blowfly Traps: Abundance and Activity of Blowflies and Other Flies in Menard County, Tex.**—*J. econ. Ent.* **31.** 750-763. 1 fig., 8 tables. [1 ref.]

The results are given of a four-year test on the comparative abundance and activity of blowflies, especially species of *Cochliomyia*, screw-worm flies, and *Phormia*, wool-maggot flies. The observations were made by examining the numbers of flies caught in traps placed in different situations. Since the flies were only identified as to genus in the case of *Cochliomyia* and *Phormia*, no evidence was obtained as to the comparative abundance of the different species of these blowflies. Traps placed in open sunlight, in situations where they are protected from direct wind, and surrounded with timber and undergrowth of medium density, are the most attractive to *Cochliomyia* species. *Phormia* species prefer more shaded areas and higher humidity, with more surrounding timber and undergrowth.—R. P. HOBSON.

BRUCE, W. G. (1938). **Soil Moisture and Its Relation to the Mortality of *Hypoderma* Pupae.**—*J. econ. Ent.* **31.** 639-642. 2 figs., 2 tables. [10 refs.]

Cattle warbles are absent from the Red River Valley of the North, in the United States, the limiting factor apparently being excessive soil moisture. Experiments were carried out with *Hypoderma* pupae kept in loam soils of various water content. Pupae of *H. bovis* did not develop in soils whose moisture content was more than 20%; the upper limiting value for *H. lineatum* was 10%. The minimum values were not determined, but emergence occurred in soils containing 1% moisture.—R. P. HOBSON.

KUWAYAMA, S., & KATO, S. (1939). **On *Lyperosia irritans* L., the so-called Horn-fly, in Japan.**—*Oyo Kontyû.* **1.** 151-159. 1 plate. [Copied *verbatim* from *Rev. appl. Ent.* **27.** 154-155].

Lyperosia irritans, L., is widespread in Hokkaido, where it was first observed in 1937. It is common on cows, but very rare on horses. Near Sapporo, adults were observed from June or earlier; they suddenly increased in numbers in August, and disappeared in mid-October. The morphology of the adult is described and compared with that of *Stomoxys calcitrans*, L.

HENRY, A., & GUILHON, J. (1939). Observations sur la gale déplumante des oiseaux. [**Depluming Mange of Birds**].—*Rec. Méd. vét.* **115.** 193-209. 8 figs. [15 refs.]

The authors describe a case of mange in a cage canary at Alfort, due to the mite *Microlichus avus*. A severe infestation of the feather follicles and skin had resulted in extensive denuded lesions over the chest, shoulders and head. This mite has been recorded from several of the smaller wild and cage birds, but has not previously been observed to cause serious ill-effects. The different stages of the mite are described in detail, and reasons are given for believing that it may be transmitted by the pupiparous fly *Ornithomyia fringillina*.

The authors also describe a case of mange in an Egyptian turtle-dove, due to the mite *Cnemidocoptes laevis*, which is known to cause mange of the tunnelling type in poultry, pigeons and game birds.—J. MACLEOD.

ANON. (1936). Lucha contra la sarna ovina. Cuadros demonstrativos de lo actuado por la dirección de ganaderia durante el primer semestre del corriente año. [**Sheep Scab in Uruguay: Statistics**].—*Bol. mens. Direcc. Ganad., Montevideo.* **20.** 100-102. 2 tables.

This article gives in tabular form the number of herds free or infected with sheep scab as reported during the months February to June, 1936, in the various departments of Uruguay. The totals are :– 909 infected herds comprising 650,646 sheep; 7,663 herds, without recent infection, comprising 6,448,497 sheep.

—. (1939). **Report of the North East of Scotland Sheep Tick Committee—1938.** pp. 55. 5 figs., 3 diagrams. Aberdeen: Secretary, 12, Golden Square. [8vo].

The North East of Scotland Sheep Tick Committee consisting of landowners, estate factors, farmers and gamekeepers was formed in 1937 to further co-operative action against the sheep tick *Ixodes ricinus*. The Committee has pursued three lines of operation, namely publicity, governmental intervention and assistance, and experimental work. They have based their publicity campaign upon the statement of the United States Department of Agriculture that " Tick eradication will proceed just as rapidly as the people desire that it shall " and have held public

meetings and contributed letters and articles to the newspapers to further this campaign. The experimental work has been conducted with the co-operation of the North of Scotland College of Agriculture, the Committee being responsible for the provision of sheep stocks and field staff for large scale field experiments. All the domestic and most wild animals in some of the hill areas have been found attacked by *I. ricinus*. The seasonal activity in this area is continuous from early spring to late autumn. Four serial dipping experiments were carried out and in all cases dipping at three-weekly intervals was found to have no apparent harmful effects upon the sheep. On one farm, which had previously been abandoned because of tick infestation, only seven deaths out of 375 gimmers were recorded. On the Hill of Fare [*V. B.* **9.** 393.] there was a reduction of about 25% on the tick count in 1937; 16 of 474 sheep inoculated with louping ill vaccine and 16 of 24 uninoculated sheep died. Where dipping was impracticable a spraying method was evolved. This consisted of turning up the sheep and spraying the bare skin beneath the legs, and also the head and neck by means of a power sprayer. A smear consisting of a mineral oil-wool grease base with pyrethrum extract as the parasiticide protected lambs against tick attack for 30 days.—W. Moore.

Cooley, R. A. (1938). **The Genera** *Dermacentor* **and** *Otocentor* **(Ixodidae) in the United States with Studies in Variation.**—*Nat. Inst. Hlth Bull.* No. 171. pp. 89. 5 text figs., 30 plates, 9 tables. [Numerous refs.]

This bulletin gives the key to the known species of *Dermacentor* found in the U.S.A., together with full descriptions of the different stages, variation within the species, geographical distribution and hosts of each species. The species described are *D. variabilis*, *D. andersoni*, *D. occidentalis*, *D. hunteri*, *D. parumapertus*, *D. halli* and *D. albipictus*; what was formerly known as *D. nitens* is included under the name of *Otocentor nitens*. The text is fully illustrated with coloured plates and drawings showing the characters of each species.—W. Moore.

Stewart, W. L. (1939). **The Tick Problem.**—*Vet. Rec.* **51.** 93-98. 1 table.

In Northumberland the native sheep possess a high degree of immunity against tick-borne diseases, such as louping ill and " tick-borne fever ", and disease directly due to the tick infestation, such as pyaemia, but apparently this is not transmitted in an appreciable degree to their lambs. It is amongst the lambs therefore, that the heaviest losses from tick-borne diseases occur, the most important being pyaemia and " louping ill ". When unacclimatized sheep are transferred to tick-infested pastures, the death rate may be 80%, and the abortion rate in pregnant ewes 50%. Protection against tick attack was obtained by systematically dipping ewes and lambs at three-weekly intervals during the tick season. Where it was impracticable to collect lambs for dipping, protection was obtained by dusting the lambs as soon after birth as possible with a powdered preparation of ground derris root, which had no harmful effect on the skin or fleece. Smearing with derris in oil gave a high degree of protection and the lambs so treated showed a live weight increase of about 40% over the controls.—W. M.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Mandoul, R. (1939). Recherches récentes et opinions nouvelles sur la toxicité des helminthes. [**Modern Views on the Toxicity of Helminths**].—*Ann. Parasit. hum. comp.* **17.** 187-192. [1 ref.]

An extract, toxic for g. pigs, was obtained from *Ascaris equorum* after treatment

with trichloracetic acid. The exact nature of the toxic fraction was not determined, but it may prove to be a polypeptide. It was not comparable to bacterial exotoxins or glucido-lipoid endotoxins, and was not analogous with histamine-like toxins of low molecular weight; neither did it consist of such proteins as albumens or globulins. The extracts were thermolabile, and soon became inactivated when kept on ice. G. pigs injected with sub-lethal doses of the extract showed some degree of resistance to subsequent injection of known fatal doses. No such toxins were established in *Moniezia expansa* and *Fasciola hepatica* by the use of similar experiments.—M. L. BINGHAM.

SPINDLER, L. A. (1936). **The Effects of Natural Factors, Rain and Sun, on Survival of Eggs and Larvae of Animal Parasites under Tropical Conditions.** —*Agric. Notes, Puerto Rico.* [*fed.*] *agric. Exp. Sta.* No. 74. pp. 4.

S. carried out the experiments from May to August using eggs of *Ascaria suis* and *Macracanthorhynchus hirudinaceus*, the infective larvae of *Stephanurus dentatus*, *Oesophagostomum dentatum*, *Haemonchus contortus* and *Ancylostoma caninum*, and various undetermined horse strongyle larvae.

On unshaded, gently sloping areas, covered by grass approximately four inches long, all larvae with the exception of the horse strongyle larvae failed to survive more than 20 days. Viable eggs were not recovered after 25 days. On partially shaded bare soil larvae did not survive more than twelve days, again with the exception of the horse strongyle larvae. When fully exposed to the sun on a steep slope, all the larvae except those of the horse strongyles failed to survive for more than six days. Conclusive evidence could not be got regarding the viability of horse strongyle larvae because torrential rains washed them out of the ground. These rains reduced the number of larvae in piles of infested manure, and piles exposed to rain, sun and air were almost entirely free from larvae in four to six weeks. 50-70% of the larvae in the piles of manure were in the upper portions of the piles, and no larvae were found more than eight inches away from the piles. In the laboratory, undeveloped unembryonated eggs of *M. hirudinaceus* in water in a glass dish were killed by the sun's action in three hours, while embryonated eggs under the same conditions were killed in from five and a half to nine hours. All larvae were killed by one hour's exposure in water to sunlight, with the exception of horse strongyle larvae which were killed after nine hours' exposure. S. concludes that in Puerto Rico utilization of sunlight and heavy rains will aid the control of parasitic diseases. He suggests that animals should be kept off a pasture for three or four weeks during the heavy rains, by virtue of which the larvae and eggs will be widely scattered or washed away.—A. L. WILSON.

ROBERTS, F. H. S. (1939). **The Occurrence and Prevalence of Gastro-Intestinal Helminths in Apparently Healthy Cattle in Queensland, Australia.**—*J. comp. Path.* **52.** 160-165. [4 refs.] [Author's summary copied *verbatim*].

1. In an examination of the alimentary tract of 237 apparently healthy young cattle, helminths were present in 97·13%. Twenty-nine species were found.

2. The most frequently encountered species were *Haemonchus contortus* (86·7%), *Ostertagia ostertagi* (75·2%), *Bosicola radiatum* (75·6%), *Cooperia pectinata* (78·2%), *C. punctata* (72·3%), *Strongyloides papillosus* (57·8%), and *Bunostomum phlebotomum* (44·5%).

3. Counts or estimations of the numbers of each species were made in every animal.

FRICKERS, J. (1938). Het voorkomen van Dipylidium caninum (Linné 1758); Toxocara canis (Werner, 1782); Ancylostoma caninum (Ercolani 1859);

Dirofilaria immitis (Leydi 1856) en Spirocerca sanguinolenta (Rudolphi 1819) bij den hond (Canis familiaris) in Suriname. [**The Occurrence of** *Dipylidium caninum*, *Toxocara canis*, *Ancylostoma caninum*, *Dirofilaria immitis* **and** *Spirocerca sanguinolenta* **in Dogs in Surinam**].—*Tijdschr. Diergeneesk.* **65.** 921-924. 3 tables. [English, French and German summaries].

F. examined 400 stray dogs in Surinam for intestinal worms. *Dipylidium caninum* was found in 11·25%, *Toxocara canis* in 8%; *Dirofilaria immitis* in 28%, and *Spirocerca sanguinolenta* in 66·5%. The occurrence of *D. immitis* and *S. sanguinolenta* increased with the age of the animals, while that of *T. canis* decreased.
—JAC. JANSEN (UTRECHT).

CALZADA, V. (1936). Contribución al conocimiento de la parasitologia regional. [**Animal Parasites in Uruguay**].—*Bol. mens. Direcc. Ganad., Montevideo.* **20.** 216-218.

C. gives a list of the worms found in sheep, up to date. He also reports the discovery for the first time in Uruguay of *Trichostrongylus colubriformis* and *Cooperia curticei*. The worms in order of importance are :– *Haemonchus contortus*, *Trichostrongylus extenuatus*, *Ostertagia circumcincta*, *Nematodirus filicollis*, *Nematodirus spathiger*, *Cooperia curticei*, *Oesophagostomum columbianum*, *Trichocephalus affinis*, *Ostertagia trifurcata*, *Bunostomum trigonocephalum*, *Chabertia ovina*, *Moniezia* spp. and *Ostertagia ostertagi*.

BUCKLEY, J. J. C. (1938). **On a Dermatitis in Malays Caused by the Cercariae of** *Schistosoma spindale* **Montgomery, 1906.**—*J. Helminth.* **16.** 117-120. [8 refs.]

B. submits evidence that " sawah itch " of workers in the rice fields is due to the cercariae of *S. spindale*. The normal host in this locality is the buffalo, but man may become infected when working in close association with buffaloes, which are responsible for infection in *Planorbis exustus*.—M. L. BINGHAM.

RAO, M. A. N. (1939). **A Brief Review of the Species of Schistosomes of the Domesticated Animals in India and their Molluscan Hosts.**—*Indian vet. J.* **15.** 349-358. [20 refs.]

Indigenous species of schistosomes in India are :– *S. spindalis*, *S. nasalis*, *S. indicum*, *S. suis*, and *Ornithobilharzia bomfordi*. *S. bovis* and *S. japonicum* have been recorded, but the absence of their molluscan hosts in India indicates that they do not exist in that country. As yet, the only snail hosts recorded are those of *S. nasalis* and *S. spindalis*. Some authors still do not accept *S. nasalis* as a new species [*V. B.* **4.** 249.], but regard it as a variety of *S. spindalis* [BHALERAO. (1937). *Indian J. vet. Sci.* **8.** 149-157]. R. stresses the value of anatomical examinations of miracidia as well as cercariae as an aid to the identification of species of schistosomes.—M. L. BINGHAM.

TOOLE, H. (1937). Die Echinokokkenkrankheit in Griechenland. [**Echinococcosis in Greece**].—*Arch. klin. Chir.* **188.** 459-465. 2 figs., 4 tables. [Numerous refs.] [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **127.** 510].

2,069 cases of human echinococcosis were diagnosed in Greece from 1929-1936, the number of cases increasing regularly every year.

REID, W. M., ACKERT, J. E., & CASE, A. A. (1938). **Studies on the Life History and Biology of the Fowl Tapeworm** *Raillietina cesticillus* (**Molin**).—*Trans.*

Amer. micr. Soc. **57.** 65-76. [Copied *verbatim* from *Helminth. Abstr.* **7.** 26. Signed: R. T. L.]

Two genera and 12 species of ground beetles (Carabidae) are reported as new intermediate hosts for *Raillietina cesticillus* in fowls. As many as 626 cysticercoids occurred in one beetle fed on 4 proglottids. Gravid segments were produced in 11 to 14 days after experimental feeding with cysticercoids. A complete list of known intermediaries is given. The cysticercoids are characterized by two funnel-like structures in the membranes which surround the hexacanth embryo. Most of the segments voided by chickens are passed in the afternoon and evening. Valuable details are given on technique.

WETZEL, R. (1937). Der Fleischbeschauer und die Finnen-Bandwurmfrage. [**Problem of *Cysticercus* in Meat Inspection**].—*Rdsch. Fleischbesch.* No. 18. pp. 16. [Copied *verbatim* from *Helminth Abstr.* **6.** 150. Signed: B. G. P.]

Wetzel gives a general account of the tapeworm larvae met with in meat inspection, illustrated by a table giving intermediate and definitive hosts and tapeworm names and locations, and also by two striking life-history diagrams.

ANDREWS, J. S. (1939). **Experimental Trichostrongylosis in Sheep and Goats.**—*J. agric. Res.* **58.** 761-770. 1 fig., 3 tables. [14 refs.]

Eleven Hampshire-Southdown lambs and three Saanen kids, about six months old, were experimentally infected with larvae of *Trichostrongylus colubriformis*, *T. vitrinus*, and *T. axei*, and the results obtained with these three species are given collectively. It was found that repeated doses of small numbers of larvae induced immunity in the animals which survived. In these animals the first and smallest dose given varied from between 250-1,000 larvae. Increasingly large doses were then administered, rising to 90,000 in one case; only 1·56% of parasites so administered were recovered P.M. If, however, 3,000 or more larvae were given as the first and smallest dose, the acquired resistance was insufficient to protect the animal, and death resulted in 16-88 days; in the latter case 41·84% of parasites were recovered P.M. Where the smallest dose was 3,000 or more, a total of 78,000 larvae was sufficient to cause death in a kid as compared with 115,000 in a lamb. It would appear, therefore, that kids are somewhat more susceptible to trichostrongylus infestation than lambs.

Eggs first appeared in the faeces 17-21 days after infestation and the maximum concentration of eggs per g. in 21-81 days. Diarrhoea occurred 13-59 days after the first administration of the larvae, and was usually continuous until death in fatal cases. Clinical characteristics were depression, colic, partial anorexia, profuse diarrhoea, and terminal cachexia. There was no anaemia, but blood examination showed marked leucocytosis.

Autopsy revealed slight ascites with diffuse enteritis, and a friable condition of the liver. Histological examination showed a generalized circulatory disturbance leading to passive congestion of the liver and kidneys with degeneration and leucocytic infiltration.—D. D. OGILVIE.

LANDSBURG, J. W. (1939). **Hookworm Disease in Dogs.**—*J. Amer. vet. med. Ass.* **94.** 389-397. [Numerous refs.]

The incidence of *Ancylostoma caninum* in the U.S.A. is high; in one survey 41·5% of mature and 44·4% immature animals proved to be infested. This nematode occurs occasionally in the cat. L. gives a description of the parasite including a detailed account of its life-history.

The larvae which develop from the excreted eggs may infect the definitive host

in one of three ways—prenatal infestation, entry through the mouth, and penetration through the skin. It is suggested that in the pregnant female, circulating larvae may enter the foetal circulation. These larvae do not develop until after birth, until then remaining dormant in the foetal organs. The second route of infestation is a direct one, the larvae passing *via* the mouth to the intestine. In the last method the larvae enter the venous circulation and are carried to the lungs, so entering the trachea, and they then pass to the mouth and finally to the intestine.

Although the greatest damage is caused in the intestine, the migratory habits of the larvae result in some damage while they are *en route*. The mucosa of the lower portion of the small intestine may be completely denuded. The anaemia arising from the presence of the mature worms is severe. L. discusses its cause and attributes it to blood loss; the administration of iron salts has a corrective effect.

The clinician will encounter two types of hookworm disease in the dog, the non-fatal and fatal types, the course of the disease in a particular animal being determined by the number of parasites present. The chronic type of hookworm disease characteristic of human infestations, with a low grade anaemia present over a long period, is not seen in the dog. Young dogs are more susceptible and succumb more easily than adults; L. briefly discusses the reason for this phenomenon. Malnutrition increases the susceptibility and lowers the resistance of a resistant animal; conversely, change to an adequate diet results in a spontaneous loss of worms.

The parasites may be expelled by the administration of anthelmintics such as carbon tetrachloride, or tetrachlorethylene; these should be followed by iron salts. Other control measures suggested include the washing of floors of runs, kennels, etc., with hot water, and the turning over of soil of outdoor runs.—L. E. H.

CLAPHAM, Phyllis A. (1939). **On the Larval Migration of *Syngamus trachea* and Its Causal Relationship to Pneumonia in Young Birds.**—*J. Helminth.* **17.** 159-162. [3 refs.] [See also *V. B.* **9.** 720].

C. reviews briefly the various theories put forward on the actual route taken by the larvae of *S.t.* from the intestine to the lungs. It has been shown experimentally by feeding chicks with earth-worms, heavily infected with gapeworm larvae, that the larvae pass from the intestine to the lungs through the blood-stream. The parasite is pathogenic in both the larval and adult stages. In young birds exposed to infection death occurs from pneumonia caused by the migrating larvae, and a condition of "*Syngamus* pneumonia" occurs among partridge and pheasant chicks. The feeding habits of the parasite are described; it is a blood sucker throughout its life.—S. G. IYER.

ALICATA, J. E. (1938). **Preliminary Note on the Life History of *Subulura brumpti*, a Common Cecal Nematode of Poultry in Hawaii.**—*J. Parasit.* **25.** 179-180. 1 fig.

A. shows that the life-history of this parasite is indirect. Five different species of insects, namely *Dermestes vulpinus*, *Gonocephalus seriatum*, *Ammophorus insularis*, *Alphitobius diaperinus* and *Euborellia annulipes*, have been found naturally infected with encysted larvae of *Subulura brumpti*. Encysted larvae from the body cavities of various insects were fed to laboratory-raised chicks; an equal number of chicks were kept as controls under identical conditions. While the control birds were free from helminths, all the experimentally infected chicks were infested. The possibility of a direct life-history was ruled out by adequately controlled experiments.—S. G. IYER.

HUTSON, L. R. (1938). **Some Observations on Manson's Eyeworm of Poultry in Antigua, B. W. I., and a Suggested Method of Control.**—*Trop. Agriculture, Trin.* **15.** 66-68. 2 tables. [2 refs.]

H. experimented with six chickens, using three as controls. The nictitating membrane was removed from the eyes of three of the birds, and adult larvae of *Oxyspirura mansoni* were fed to them or placed in the eyes. The control animals were infested whereas those which had the membrane removed remained free. H. proposes to carry out further tests.

IMMUNITY

ANON. (1936). Reglamentación sobre tuberculinizaciones particulares. [**Regulations for Tuberculin Testing**].—*Bol. mens. Direcc. Ganad., Montevideo.* **20.** 238-240.

These are modifications of previous regulations on the method of conducting and registering tuberculin tests in Uruguay. In future veterinarians wishing to carry out tuberculin tests must do so in co-operation with the Ministry of Animal Industry, which enforces a uniform system on orthodox lines.

HANKIN, T. H. (1937). **Some Observations on the Intradermal Tuberculin Test Applied to Pigs.**—*Aust. vet. J.* **13.** 241-245. 3 tables.

H. records the results obtained by subjecting 448 pigs to an intradermal tuberculin test. There were 33 reactors in which lesions of tuberculosis were demonstrated at P.M. examination. Among the 415 non-reactors 54 animals showed small lesions in lymph nodes which, H. states, would be classed as tuberculous during routine meat inspection. Some laboratory tests indicated that many of these lesions did not contain mammalian tubercle bacilli. [These tests were incomplete and reliable conclusions cannot be drawn from the results].

—T. S. GREGORY.

BLOUNT, W. P. (1938). **A Note on the Reliability of the Avian Tuberculin Test.** —*Vet. Rec.* **50.** 1772-1773.

The reliability of the tuberculin test in poultry, when properly applied and nterpreted, is confirmed. The technique of the test and the criteria of positive and negative reactions are described in detail, emphasis being laid on the significance of oedema in positive reactions.—H. BURROW.

HENSEL, G. (1937). Erhöhung und Verlängerung der tuberkulösen Allergie beim Meerschweinchen durch Vorbehandlung mit abgetöteten Tuberkelbazillen in Verbindung mit Lanolin und Vaselin. [**The Prolongation of Tuberculous Allergy by Injection of Killed Tubercle Bacilli Suspended in Lanoline or Vaseline**].—*Beitr. Klin. Tuberk.* **90.** 387-390. 1 table. [6 refs.] [Abs. from abst. in *Bull. Inst. Pasteur.* **36.** 20].

H. says that the injection of killed tubercle bacilli suspended in lanoline, vaseline or paraffin produces a much more intense and lasting allergy to tuberculin than the inoculation of the bacilli alone. Doses of 1 mg. and even less are sufficient to produce allergy.

WATANUKI, T., & FUJII, T. (1935). [**Rapid Agglutination Tests in the Diagnosis of Bovine Contagious Abortion**].—*Mitt. Regierungsinst. Tierseuchen. Nishi-*

gahara, Tokyo. **15.** 13-37. [In Japanese: abst. from abst. in *Jber. Vet.-Med.* **59.** 419].

The antigen is prepared from a 3-4 day culture on an agar slant suspended in 1-1·5 c.c. of an 8% saline solution. After being left overnight in the refrigerator, it is slowly heated to boiling point, then cooled and filtered through cotton wool. 0·5% of phenol is added to the filtrate as a preservative, and 0·02-0·05 c.c. of a saturated aqueous solution of Gentian violet is added to 100 c.c. of the mixture. This antigen retains its properties for six months. The rapid reaction is observed 5-10 minutes after mixing the serum and antigen at 33-35°C. Tests carried out by this method agreed in 97% of cases with results obtained by the tube agglutination test.

THIESSEN, K. H. (1937). Vergleichende Untersuchungen über verschiedene Schnellagglutinationsverfahren zur Feststellung der Bruzellose des Rindes. [**Various Rapid Agglutination Methods for the Diagnosis of Bovine Brucellosis**].—*Inaug. Diss., Hanover.* pp. 40. 16 tables. [Numerous refs.]

The authors compared the value of rapid tests with the usual tube method for the diagnosis of *Brucella abortus* infection. The rapid tests were performed according to methods described by Diernhofer, by Berge-Ekrem and by Donham and Fitch. Tests using fresh whole blood were found to be unsatisfactory, but with blood serum, close agreement was obtained with the usual tube method. A satisfactory reaction was obtained even with sera containing agglutinins in a low concentration, particularly with the Diernhofer antigen. Comparative tests were also carried out with whole milk and with whey, and more satisfactory results were obtained with the latter.—S. J. EDWARDS.

I. SEELEMANN, M., & PFEFFER, A. (1938). Die Feststellung der Abortus-Banginfektion (Bruzellose) des Rindes mit Hilfe serologischer Verfahren. I. Mitteilung. Die Flockungsreaktionen mit Blut und Milch. [**Serological Diagnosis of Bovine Brucellosis. I. Flocculation with Blood and Milk**].—*Z. InfektKr. Haustiere.* **53.** 211-235. 7 tables. [11 refs.]

II. SEELEMANN, M., & WOLF, C. H. (1938). Die Feststellung der Abortus-Bang-Infektion (Bruzellose) des Rindes mit Hilfe serologischer Verfahren. II. Mitteilung. Die Schnell- und Langsamagglutination mit Blut und Milch. [**Serological Diagnosis of *Brucella abortus* Infection in Cattle. II. Rapid and Slow Agglutination Tests with Blood and Milk**].—*Ibid.* **54.** 21-43. 7 tables. [Numerous refs.]

I. A lengthy report of serological work carried out to study the value of the Meinicke and Sachweh flocculation reactions for testing blood serum, whole milk and whey for the presence of *Br. abortus* antibodies. It is concluded that these tests are eminently suited for the purpose of diagnosing contagious abortion. Details of the technique and of experimental data are recorded.

II. An extensive report of an investigation into the reliability of the rapid slide agglutination test for the diagnosis of contagious abortion. It is concluded that the test is suitable for use both with blood and with milk serum, and that it is a sensitive and an accurate test applicable to eradication schemes.—E. J. P.

GLÄSSER. (1938). Eine Fehlerquelle der Langsamagglutinationsmethode bei der Bangkrankheit und ihre Abstellung. [**Sources of Error in the Slow Agglutination (Test Tube) Method for Diagnosis of Bovine Brucellosis—Contamination Growth**].—*Dtsch. tierärztl. Wschr.* **46.** 23-24.

During the conduct of numerous agglutination tests by the tube method, G.

observed the presence of a deposit unaccompanied by any degree of clearing and disappearing in diminishing serum dilutions. This deposit was found to consist of bacterial growth composed of spore-forming organisms belonging to the *Bacillus subtilis* group, which were apparently not inhibited by 0·5% carbolic acid in saline. The growth of these organisms could, however, be prevented by including chinosol in a concentration of 1:10,000.—S. J. EDWARDS.

SCHELLNER, H. (1939). Zur Serodiagnose der Bruzellose des Pferdes mit besonderer Berücksichtigung der Meinicke-Klärungs-Reaktion. [**Diagnosis of Equine Brucellosis with Meinicke's Reaction**].—*Tierärztl. Rdsch.* **44.** 183-185. 1 table. [8 refs.]

The Meinicke reaction was applied to the sera of 6,000 horses, and of these 78 (1·3%) were positive. Only seven of these sera reacted to the agglutination test, and 41 to the complement-fixation test. S. considers that non-specific reactions occurred which were due to the presence of immune substances produced by streptococcal infections.—S. J. EDWARDS.

RAKE, G. (1938). **Active Immunity against an Intestinal and a Respiratory Infection.**—*Amer. J. Hyg.* **28.** 377-389. 7 tables. [18 refs.]

A heavy mortality occurred amongst guinea pigs and the causes of death were two well-known bacteria pathogenic for these animals, namely *Salmonella enteritidis* and pneumococcus type XIX. A third infection due to *Brucella bronchiseptica* developed later. The conditions were suitable for a controlled vaccination experiment and accordingly, female g. pigs were taken when born and placed into one of three groups as follows :– (a) unvaccinated ; (b) inoculated on the 7th, 14th and 21st days of life, and (c) inoculated on the 21st, 28th and 35th days of life. The vaccine given to groups (b) and (c) consisted of a mixture of type XIX pneumococcus and *S. enteritidis*. The vaccines were killed with formalin and given subcutaneously. The results showed that the mortality from *S. enteritidis* infection in the unvaccinated group was three times as great as that in the combined vaccinated groups. There was however no suggestion that vaccination gave any protection against pneumococcus type XIX infections.

Although these results cannot be applied directly to problems of disease associated with other animals or man, they are of interest, and it would appear that they could be applied directly to problems connected with diseases of laboratory animals, which are a matter of particular importance.—R. LOVELL.

CHURCH, C. F. (1939). **Factors Influencing Nonspecific Resistance to Infection.** —*Amer. J. publ. Hlth.* **29.** 215-223. 6 figs., 2 tables. [13 refs.]

Non-specific resistance to infection was studied in 2,868 mice of three lines, inoculated with *Salmonella enteritidis*. The three lines of mice were a resistant line, a susceptible line and an unselected group. When the external environment and the parasite factors such as the strain, virulence, dosage and portal of entry were kept constant, the survival of mice at risk was dependent on heredity and nutrition. When the dietary background was kept uniform the mortality of the three lines of mice was according to expectation. The resistant line gave 89% survival at 28 days after inoculation, the susceptible line gave less than 2% survival after the same time, whilst the unselected group gave an intermediate survival rate. This shows the marked degree to which heredity may influence host resistance when all other factors are kept constant.

There was a normal frequency distribution of deaths at about the 9th to the 12th day after inoculation, and this is well shown graphically. This point appears

to coincide with the antibody response of those that survive the first onslaught of infection and it is suggested that the mean survival time obtained in this way is a measure of non-specific resistance which can be applied to any homogeneous population tested with a suitable pathogen under controlled conditions.

Host resistance does not appear to be readily influenced by the diet during or immediately preceding the period of infection. On the other hand, the diet of the mother before and during gestation was a factor of major importance in influencing the resistance of the offspring to the risk of infection. Progressive improvement took place for at least three generations on the same diet; the influence of diet may thus be on a par with the influence of heredity.—R. LOVELL.

TREFEU, P. (1938). Recherches sur la nature des ferments anaphylactiques. [**The Nature of Anaphylactic Ferments**].—*Thesis, Alfort.* pp. 60. [Numerous refs.]

This thesis describes investigations into anaphylactic ferments after electrolysis. According to MAIGNON three phases occur in anaphylaxis :– (1) appearance in the blood of primary ferments which reduce proteins to peptones; (2) the formation of secondary ferments which reduce peptones to amino-acids, and (3) a stage during which the primary ferments remain after the secondary ones disappear. In the third stage the animal is sensitized and an injection of protein causes anaphylaxis by the breaking down of proteins into peptones.

Pancreatic ferments and ovalbumin were submitted to electrolysis. In the case of pancreatic ferments this process was complete after 7 days and all power of fermentation was destroyed. Ovalbumin was completely electrolysed in 4 hours. Experiments are described in which dogs were injected with horse serum and ovalbumin; after bleeding, the ferment was extracted and tested on g. pigs. Electrolysis of the blood ferments is completed sooner than in the case of true ferments and does not coincide with a loss of activity, but if it is continued activity is diminished or suppressed. The anaphylactic ferments appear to behave like antibodies which activate complement.—S. J. GILBERT.

FRIEDEMANN, U., & ZUGER, B. (1939). **Quantitative Studies on the Neutralization of Pathogenic Agents in Tissues by Circulating Antibodies. I. Time-Factors.** —*J. Immunol.* **36.** 193-203. 5 tables. [10 refs.]

In the simple case of toxin-antitoxin neutralization in skin tests the difficulty or ease with which toxin is neutralized by circulating antibody is not influenced by the velocity of the toxin-tissue neutralization reactions provided the antitoxin is injected before the toxin. This reaction incidentally follows the law of multiple proportions under such conditions. If antitoxin is inoculated shortly after the toxin, however, more antitoxin is required to effect neutralization. These facts indicate that if antitoxin is present before the toxin is introduced, neutralization takes place before tissue combination has occurred.—E. J. PULLINGER.

RAMON, G., BOCAGE, A., BOIVIN, A., MERCIER, P., RICHOU, R., & DEFRANCE, M. (1937). Résultats d'ensemble de l'anatoxithérapie spécifique des affections staphylococciques. [**Anatoxin Therapy of Staphylococcal Infections**].—*Pr. méd.* **45.** 889-892. [Numerous refs.] [Abst. from abst. in *Bull. Inst. Pasteur.* **36.** 421.]

The authors report the results of treatment of local staphylococcal infection of 600 people by anatoxin [*V. B.* **8.** 378.]; 90% were successful. Anatoxin purified by trichloracetic acid was found to be less irritant and just as effective as anatoxin not so purified.

RAMON, G., LEMETAYER, E., RICHOU, R., MACCOLINI, R., DJOURICHITCH, M., PERAGALLO, I., & ROUCHDI, M. (1937). Immunisation antitoxique " concentrée " et immunité renforcée sans addition à l'antigène de substances stimulantes. (4e. Mémoire). [**" Concentrated " Antitoxic Immunization Without the Addition of Stimulating Substances to the Antigen**].—*Rev. Immunol.* **3.** 505-529. 11 tables. [8 refs.]

In a series of experiments with groups of three rabbits, a total absence of intoxication was demonstrated after repeated minute doses of tetanus toxin subcutaneously at the same point. In contrast, rabbits which were injected with the same doses of toxin at similar intervals by the same route, but at different points, developed rapidly fatal tetanic symptoms. The authors illustrate the possibility of quickly producing a high standard of specific immunity in the rabbit by multiple injections at the same point of minute amounts of active toxin, representing a relatively small total amount of antigen. Similar results were obtained from experiments with tetanus anatoxin and diphtheria and staphylococcal toxins. Repeated fractional doses of diphtheria and tetanus anatoxins established an immunity of a much higher degree than that obtained by a single injection of the total dose.—R. O. MUIR.

BOIVIN, A., & MESROBEANU, Lydia. (1939). Recherches sur les antigènes somatiques et sur les endotoxines des bacteries. VI.—Sur la nature chimique et sur les propriétés biologiques des antigènes O et Vi du bacille typhique. [**Research on Somatic Antigens and Bacterial Endotoxins. VI. Chemical Nature and Biological Properties of O and Vi Antigens of** *Salmonella typhi*]. —*Rev. Immunol.* **4.** 469-480. 5 tables. [Numerous refs.] [See also *V. B.* **9.** 252].

Two distinct glyco-lipoid complexes were isolated from three antigenic types of *Salmonella typhi* by extraction of their suspensions with trichloracetic acid. The " O " somatic antigen only was obtained from one type, the " Vi " somatic antigen only, from the second type, and a mixture of both antigens from the third type. To this latter type, all virulent typhoid bacilli are stated to belong. Chemical, serological and biological criteria are described for the differentiation of the two antigens. Mice which had been immunized with one or the other antigen were found to withstand an intraperitoneal injection of a very small number of M.L.D. of the antigen used for vaccination only. On the other hand, vaccination with either antigen conferred an equal resistance to infection with virulent typhoid bacilli suspended in broth containing 5% mucin. Maximum anti-endotoxic immunity was produced by vaccination with both somatic antigens.—R. O. MUIR.

ZAGRODZKI, K., KULCZYCKI, J., BAK, A., & SIDOR, K. (1937). Nowy środek leczyniczy AT_2. [**A Therapeutic Agent for Suppurative Conditions—AT_2**]. —*Biul. wet. Wojsk.* **3.** 2-19. [French and German summaries].

Polyvalent bacterial culture filtrates similar to Besredka's antivirus were mixed with tapioca and given the names AT_1 and AT_2.—A. SZWABOWICZ (Lwów).

DISEASES, GENERAL

GILMAN, H. L. (1939). **Some Causes of Abortion in Cattle Free from Bang's Disease.**—*Cornell Vet.* **29.** 153-165. [Numerous refs.]

This article consists mainly of a reiteration of well-established facts. The following known or suspected causes of abortion are discussed :- trichomonads ;

vibrios ; *Corynebacterium pyogenes* ; streptococci ; *Salmonella paratyphi* ; moulds and fungi ; tuberculosis ; miscellaneous bacteria ; genital vesicular exanthema ; ergot ; nutritional factors ; endocrines ; inherited defects ; injuries, and miscellaneous causes.—D. D. OGILVIE.

NIEMEYER, W. E. (1939). **Paratyphoid and Trichomonas Infection in Pigeons.** —*J. Amer. vet. med. Ass.* **94.** 434-435. [5 refs.]

In a large pigeon loft 30 % of the birds developed nasal and ocular discharge and diarrhoea, and 60 squabs died. Autopsy revealed mucopurulent discharge in the nasal and oral cavities, and caseated material in the oesophagus. Hyperaemia of the liver, congestion of the spleen, exudative pericarditis, catarrh of the air sacs and local necrosis of the lungs were also noted. Numerous *Trichomonas columbae* were recovered from the lesions. In three cases *Salmonella typhi-murium* appeared in blood cultures. Transmission experiments were successful, but only *T. columbae* could be recovered from birds which succumbed to experimental inoculation.

—D. D. OGILVIE.

SEIFRIED, O. (1939). Leukosen der Haustiere. [**Leucosis of Domestic Animals**]. —*Tierärztl. Rdsch.* **45.** 26-30 and 43-45. 1 table. [Numerous refs.]

Bovine leucosis occurs in most of the countries of Europe and in some other countries, but it is particularly prevalent in Germany to the east of the river Elbe. In the worst cases it may affect one third of the herd. It seems to have increased 100 % in Germany since 1927.

Three different theories have been suggested to account for the disease :- infection, protein poisoning, and inheritance. A great deal of work has been done on the first theory, and so far no specific bacteria have been discovered. DOBBERSTEIN and his assistants showed that the disease can be reproduced by means of the blood, blood serum, or serum globulin of affected cattle. DOBBERSTEIN considers that bovine leucosis has a similar etiology to avian leucosis, fowl sarcoma, transmissible mouse carcinoma and equine infectious anaemia.

DOBBERSTEIN and PAARMANN also suggested that the disease might be a chronic protein intoxication, as changes in the blood picture similar to leucosis have been produced by the prolonged administration of various proteins. Finally it has been suggested that certain animals have an inherited predisposition to leucosis.

Bovine leucosis has very varied clinical features, but in general the affected animals gradually lose condition and become emaciated, usually showing enlarged lymph nodes. The condition may have three separate forms—leucaemic, aleucaemic and subleucaemic and the following variations in the blood picture occur :- (1) anaemia with an otherwise normal blood picture, (2) anaemia with leucopenia, (3) anaemia with leucaemia, (4) leucaemia with a normal R.B.C. count, and (5) leucopenia with a normal R.B.C. count.

Leucosis in cattle resembles lymphadenosis, myelosis and lymphosarcomatosis of poultry, g. pigs and mice. The lymphadenotic type is commoner in cattle than the other two.—SASSENHOFF (MUNICH).

BLAKEMORE, F. (1939). **The Nature of Fowl Paralysis (Neurolymphomatosis).** —*J. comp. Path.* **52.** 144-159. 7 figs. on 5 plates, 3 tables. [18 refs.] [Author's summary copied *verbatim*].

By inbreeding, fowl paralysis (neurolymphomatosis) was eliminated from a strain of fowls derived from badly affected stock.

The progeny were still highly susceptible as shown by the occurrence of the disease following the injection of tissues from natural cases and exposure to natural infection.

In addition to the occurrence of typical lesions of neurolymphomatosis the injected and exposed fowls became unthrifty and developed atypical lesions in the viscera, especially the liver and heart.

Passage experiments from the atypically affected fowls were carried out in the course of which the infective agent became raised in virulence and gave rise to an acute disease.

The early lesions in the heart and liver were inflammatory in character and in some of the survivors a true lymphomatous response was found.

A study of the lesions in all stages of the infection indicates that in all probability the disease, popularly termed fowl paralysis, or neurolymphomatosis, is the chronic stage of an acute infection.

The nature of the infecting agent is now being studied. The results of the investigation are in keeping with observations made in naturally occurring outbreaks of fowl paralysis and leave little doubt concerning the infective nature of the disease.

JUNGHERR, E. (1939). **Neurolymphomatosis Phasianorum.**—*J. Amer. vet. med. Ass.* **94.** 49-52. 5 figs., 1 table. [4 refs.]

J. describes a disease resembling fowl paralysis among 1,000 four-month-old ring-necked pheasants (*Phasianus torquatus*) 3% of which became affected. They were the only birds kept, being fed on a standard turkey mash with cod-liver oil added. Various degrees of leg paralysis, and occasionally wry-neck, occurred.

Six birds received detailed study. Cultural examination was negative for all. One non-paralyzed bird merely showed lesions suggestive of degeneration of certain leg muscles. One pair of birds received an addition of vitamin B_1 in the diet, and another pair received 5% soya bean oil, in order to ascertain whether the condition was due to a nutritional deficiency, but the birds on these diets became affected. The sixth bird, found affected with bumble-foot, acted as a control.

Small round-cell infiltrations, suggestive of neurolymphomatosis, occurred in the liver, kidneys, spleen and central nervous system, and in addition there was muscle degeneration ; these lesions are described and illustrated by photomicrographs. The pancreas appeared normal. Apart from the muscle changes all the findings suggest the non-specificity of fowl paralysis for the common fowl. As the aetiology of the disease in fowls remains obscure J. proposes the term " neurolymphomatosis phasianorum " ; because it is probably a rare condition in pheasants, he thinks they may prove valuable for transmission tests of fowl paralysis. [No such tests are described].—C. V. WATKINS.

—. (1939). **Porphyrinuria in a Yearling Hereford.**—*Vet. Med.* **34.** 102-103. 2 figs.

An apparently normal yearling Hereford placed in a pasture with other cattle developed unthriftiness, dry skin and muzzle, cutaneous hypersensitiveness and purple discoloration of the teeth. It is concluded that this is a case of porphyrinuria associated with photosensitization by ultra-violet rays.—R. FISHER.

VEENSTRA, P. M. (1938). Icterus neonatorum bij den mensch en neonatale physiologische bilirubinaemie (Beijers) bij de huisdieren. [**Icterus Neonatorum in Man and Neonatal Bilirubinaemia in Domestic Animals**].—*Tijdschr. Diergeneesk.* **65.** 925-933. 1 table. [Numerous refs.]

V. gives a survey of some publications on icterus neonatorum in man and neonatal bilirubinaemia in domestic animals. This survey is too brief to be complete, a fact acknowledged by the author. The article contains no research work done by V., and there is no critical discussion.—JAC. JANSEN (UTRECHT).

MARTIN, H. M. (1939). **Notes on a Form of Renal Disease of the Dog.**—*Arch. Path.* **27.** 642-643.

A brief description of the "inflammatory shrunken kidney" of the dog believed to be identical with the late stages of interstitial nephritis, the acute stages of which are not often seen at autopsies. M. describes the gross and histological changes seen in both the acute and the chronic phases of this disease. In his short reference to symptoms he states that the first evidence of the disease is ulcerative stomatitis and the most common terminal change is severe haemorrhagic gastro-enteritis. [These observations are of interest as many observers believe in the close association of Stuttgart disease and nephritis].—GWILYM O. DAVIES.

FOX, H. (1939). **Skin Diseases Occurring in Both Man and Animals.**—*J. Amer. vet. med. Ass.* **94.** 398-403.

This is a report of a lecture, and consists of a series of descriptions of lantern slides with which the lecture was illustrated, showing such conditions as purpura, iodide eruptions, erysipelas, herpes, eczema, skin tubercle, actinomycosis, various neoplasms of the skin, ringworm, scabies, etc., with notes upon aetiology and control measures.—L. E. HUGHES.

SCHÄPER, W. (1939). Konstitutionsforschung und Tiermedizin. **[The Importance of a Knowledge of Bodily Constitution in Relation to Disease in Animals].** —*Berl. Münch. tierärztl. Wschr.* Feb. 3rd. 69-73 and Feb. 10th. 85-89.

A philosophical article dealing with constitution and genetics, and the way in which their relation to disease should be taught to veterinary students. [For more detailed matter the reader should see the author's book which is reviewed in *V. B.* **7.** 48,—and an abstract of a recent paper *V. B.* **9.** 329].—J. E.

KOLB, L. C. (1938). **Congenital Myotonia in Goats. Description of the Disease. The Effect of Quinine, Various Cinchona Derivatives, and other Alkaloids and Salts upon the Myotonic Symptom.**—*Johns Hopk. Hosp. Bull.* **63.** 221-237. 2 figs. [Numerous refs.] [Author's summary copied *verbatim*].

1. A description is given of a form of congenital myotonia occurring in goats. The animals suffer from transient attacks of muscular rigidity brought on by strenuous exertion. Typical seizures, lasting 10-20 seconds, occur when the goats are startled and make a sudden effort to leap away. Following a seizure there is a refractory period of 20-30 minutes during which the muscular rigidity cannot be induced. The tendency to myotonia is increased in cold weather.

2. Four goats—a billy, a nanny and their two kids—exhibiting this peculiar form of myotonia, were subjected to study. The symptom disappeared in the nanny during pregnancy and could not be induced until one month after its termination. It did not appear in the kids before the age of one month.

3. A typical myotonic reaction could be demonstrated when the muscles were percussed.

4. Galvanic electrical stimulation of the muscles produced simple twitches; painless faradic stimulation produced simple tetanus; painful faradic stimulation produced prolonged after-contraction.

5. Biopsy studies showed that histologically the muscles were normal.

6. Quinine and other cinchona derivatives, with the exception of quitenine, quitenidine, eucupine and atebrine relieved the myotonic state.

7. Prostigmin and pilocarpine aggravated the symptoms and prostigmin reversed the previously beneficial effect of quinine. Although there was some

suggestion that ephedrin and barium increased the symptom, they failed to reverse the effect of quinine.

8. Atropine, adrenaline, potassium, calcium, magnesium, guanidine and alcohol failed to modify the myotonus.

9. Attention is drawn to the fact that this form of congenital myotonia in goats is practically identical with human myotonia congenita or Thomsen's disease. The animals therefore afford valuable experimental material for a study of the myotonic state.

SANDERS, D. A. (1939). **Some Observations on the Nature and Transmission of Enzootic Bronchopneumonia (Pneumoenteritis) of Dairy Calves.**—*J. Amer. vet. med. Ass.* **94.** 28-32. [4 refs.]

Observations made by the author in Florida suggest that there is no single predisposing factor that will reproduce the disease as encountered under field conditions. Various organisms such as *Bact. coli*, *Pasteurella boviseptica* and species of staphylococci and penicillium were isolated from infected calves, but S. failed to reproduce the disease with them. On the other hand, healthy calves exposed with diseased calves, in both clean isolation pens and under insanitary field conditions, contracted the disease. S. concludes that losses are mostly confined to calves kept under insanitary conditions.—R. FISHER.

ŻULIŃSKI, T. (1937). Grypa prosiąt. [**Enzootic Broncho-Pneumonia in Pigs**]. —*Przegl. wet.* **52.** 149-162. [Numerous refs.] [German summary].

Fifteen young pigs which had died of a respiratory disease were examined and found to be affected with a catarrhal broncho-pneumonia, chiefly of the anterior and cardiac lobes, with or without pleurisy. Bacteriological examination yielded negative results.—A. SZWABOWICZ (LWÓW).

GALLIA, E. (1938). Einige Bemerkungen zur Zuchtstierkörung. [**Notes on the Selection of Breeding Bulls**].—*Prag. tierärztl. Arch.* **18.** 25-31.

The selection of bulls with regard to soundness and absence of hereditary defects is often unsatisfactory, careful clinical inspection failing to reveal a hereditary disposition for tuberculosis, sterility, infectious abortion, mastitis or infectious diseases of calves. The author states that bulls should come from herds known to be free from TB. and brucella infection.—V. CHLÁDEK (PRAGUE).

ATKINS, W. R. G. (1938). **Daylight in Relation to Climate and Health.**—*Brit. med. J.* Sept. 10th. 565-569. 6 figs., 1 table. [3 refs.]

An account is given of the methods of measuring solar radiation and illumination. The medical aspect is dealt with under two headings, the photo-chemical effects of light, and the physiological stimulation of living cells. Reference is made to the conversion of ergosterol into vitamin D, and to light therapy in rickets, lupus, tuberculosis, ulcers and wounds ; there is a brief note on heatstroke.

—N. J. SCORGIE.

ROSS, Ira S. (1939). **Pulmonary Epithelium and Proliferative Reactions in the Lungs. A Study of the Cellular Response in Lungs after Intratracheal Injection of Toxic and Nontoxic Foreign Substances.**—*Arch. Path.* **27.** 478-496. 17 figs. [Numerous refs.]

The nature of the lining of the pulmonary alveoli, and of the mononuclear cells frequently found within the alveolar spaces, has long been a controversial subject. The experimental work of R. on rabbits does much to clear up the matter and to reconcile the views of the three schools of thought (complete endodermal

epithelial lining, incomplete endodermal lining, and absence of endodermal epithelium and lining of mesodermal cells).

Intratracheal inoculation of varying doses of staphylococcus toxin and of iodized oil was used, and the cellular picture was studied by vital staining with neutral red, carmine or trypanblue. The animals were killed at intervals varying from 32 hours to 8 days, and the lungs were examined by various histological methods.

The main reactions to injection of staphylococcus toxin comprised a moderate exudation of neutrophile leucocytes, followed by large numbers of macrophages which ingested them. Damage to the pulmonary epithelium became more marked during the second day, and serum and red cells escaped into the alveoli with a further outpouring of neutrophiles and macrophages. Multi-nucleated giant cells were plentiful. Resolution began on the third day, the debris being removed partly by the bronchial tubes and partly by macrophages. The alveolar epithelium proliferated, this process being especially prominent by the fourth day, when the continuity of the epithelial cells with those of the bronchioles was clearly seen. Vital staining clearly showed these cells to be non-phagocytic and quite different from the macrophages. After eight days the only evidence of damage was some thickening of the alveolar walls.

The injection of iodized oil produced a milder reaction in which little or no damage was sustained by the alveolar epithelium. Epithelial proliferation was very rare. The difference in reaction was due to the strength of the stimulus, a similar reaction being provoked by very small doses of toxin. A sufficiently strong stimulus produced a cycle lasting about eight days, the maximal epithelial proliferation occurring by the third or fourth day.

It is concluded that the alveoli are lined by non-phagocytic epithelial cells similar to and continuous with those lining the bronchioles. They are stimulated only slightly by non-toxic substances. The other type of cell, the macrophage, is stimulated by both toxic and non-toxic substances. It arises from the connective tissue macrophage, and migrates freely across the alveolar epithelial borders.

—E. G. White.

I. Innes, J. R. M., Harvey, W. F., & Dawson, E. K. (1938). **Debatable Tumours in Human and Animal Pathology. VI. Meningioma.**—*Edinb. med. J.* **45.** 855-863. 38 figs. on 4 plates. [Numerous refs.]

II. Harvey, W. F., Dawson, E. K., & Innes, J. R. M. (1939). **Debatable Tumours in Human and Animal Pathology. VII. Granulosa-Cell Tumour of the Ovary.**—*Ibid.* **46.** 256-266. 58 figs. on 5 plates. [Numerous refs.]

I. A review of the literature and an examination of a considerable amount of human material leads the authors to the conclusion that the meningioma arises from stem cells of the pachy- or leptomeninx, *i.e.* from membranes of mesodermal origin. The term " meningioma " should, therefore, be retained as indicating an origin from a type cell, the meningoblast.

II. The material used for this study comprised 47 cases of granulosa-cell tumour (including four from calves) and more than 500 benign and malignant ovarian tumours of other types for comparison. The tumour arises from primitive ovarian follicle cells, and may be of very varied histological appearance. It may become differentiated to an organoid structure or it may remain diffuse. It possesses oestrogenic activity.—E. G. White.

Biester, H. E., Schwarte, L. H., & Eveleth, D. F. (1939). **Studies on a Rapidly Developing Intestinal Adenoma in a Pig.**—*Amer. J. Path.* **15.** 385-389. 1 table, 1 chart. [1 ref.]

In the course of a nutrition experiment one of the pigs failed to gain weight after the 73rd day (it was then 105 days old) and subsequently it lost weight and developed diarrhoea. The faeces contained portions of croupous membrane and a combined infection with *Salmonella suipestifer* and *Fusiformis necrophorus* was suspected. It was destroyed when 140 days old, being in a very weak state. Autopsy showed numerous elevations of the intestinal mucosa, most of which were covered with a croupous deposit. Histologically, the lesions consisted of adenomatous proliferations of the mucosa, composed mainly of undifferentiated epithelial cells. There was no evidence of malignancy. The lesions in the caecum showed large numbers of *Balantidium coli* in the croupous covering as well as in the superficial epithelial cells.

The nature of the lesions suggested a virus, but attempts to infect artificially four young pigs by introducing the tumour tissue or filtrate by various routes were without success. No evidence of *Salmonella suipestifer* was found on bacteriological examination of various tissues of the original pig.—E. G. White.

Saphir, O. (1938). **Morphological Variations of Tumour Cells.**—*Amer. J. Path.* **14.** 443-454. 10 figs. on 2 plates. [17 refs.]

Routine histological examination of a large number of human tumours revealed morphological variations among the individual tumour cells of particular neoplasms, *e.g.* basal cells or transitional cells were found in squamous cell carcinomas. This is explained by the assumption that such neoplasms arose from an area which *a priori* contained the various cells of which the tumour consists. Such variations must be considered in the histological grading of tumours and in determining their radiosensitivity. The presence of squamous cells in a basal or transitional cell carcinoma would render it less sensitive to the action of radium.—E. G. White.

Banting, F. G. (1939). **Resistance to Experimental Cancer.**—*Proc. R. Soc. Med.* **32.** 245-254.

After a review of the literature, B. describes, in the W. E. Dixon Memorial Lecture, the work carried out in his laboratory since 1926 on the Rous and Fujinami tumours in fowls, with special reference to the experimental production of resistance. Natural resistance to Rous tumour was found in 118 of 6,000 fowls used. Some birds which proved resistant to injection of cell-free tumour extract developed tumours and died following the inoculation of tumour cells. A highly resistant bird was found able to overcome the effect of the inoculation of an amount of tumour cells sufficient to kill 5,000 susceptible fowls.

The plasma of resistant birds is capable of neutralizing the cell-free filtrate of a Rous tumour, normal bird plasma being without this effect. The injection of plasma of a resistant fowl into a fowl bearing a tumour was without effect on the growth of the latter, probably because the virus, being within the cancer cell, is not affected by antibodies in the blood. The simultaneous injection of immune plasma and tumour cells sometimes resulted in the formation of a tumour, probably because the neutralization of virus requires some time for its completion.

A dose of 30 c.c. of immune plasma was sufficient to protect fowls against the inoculation a week later of 1 c.c. of tumour extract; a smaller dose of serum was insufficient, although this dose *in vitro* was sufficient to neutralize 300 c.c. of tumour extract. Dilution by body fluids and blood probably accounts for the large dose of serum required. Whereas resistant fowls are usually immune both to the inoculation of tumour cells and extracts, immune serum affords protection only against the inoculation of tumour extracts.

Similar phenomena of resistance to tumour extracts and cells were found in the Fujinami tumour. Fowls resistant to Rous tumour developed large tumours and died following inoculation of an extract of dried Fujinami tumour. There was no neutralization *in vitro* of extracts of Rous tumour cells by the plasma of Fujinami-resistant fowls or *vice versa.*

Fowls with a high degree of resistance to Rous tumour were susceptible to the injection of dibenzanthracene.

The introduction by catheter of Rous tumour extract into the trachea of fowls at the level of the bifurcation resulted in a very high incidence of lung tumours. Since the monocyte is believed to be the only cell which migrates into the lung alveoli, it is concluded that this cell takes up the virus and carries it into the lung tissue, and subsequently undergoes malignant transformation.

Experiments on somewhat similar lines were carried out on mammalian tumours in mice, but the results were inconclusive.—E. G. WHITE.

BLAHD, Margery, FRANK, Ira, and SAPHIR, O. (1939). **Experimental Endocarditis in Dogs.**—*Arch. Path.* **27.** 424-432. 2 figs. [Numerous refs.]

The production of experimental endocarditis in the dog by simple intravenous injections of pathogenic micro-organisms has only been reported in a few instances and it is widely accepted that some preliminary treatment or injection to damage the endocardium is essential in order to establish a predisposition in the valve tissues for the development of endocarditis.

In this paper the authors record that by intravenous injections of beta-haemolytic streptococci isolated from a dog, endocarditis was produced in 10 out of 25 dogs and in 4 cases by a single injection. While it seems as if the use of a virulent canine and not a human strain was the deciding factor in these cases, it also appears that preliminary treatment is not always essential for the production of experimental endocarditis.—GWILYM O. DAVIES.

NUTRITION IN RELATION TO DISEASE

ZARIBNICKY, F. (1939). Neuere Forschungen über Einfluss der Fütterung auf das Entstehen von Krankheiten. [**Recent Research on the Influence of Diet on Disease**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 283-286. [In German: English, French and Italian summaries. Discussion pp. 315-318 in English, French and German].

A survey in general terms of our knowledge regarding the relationship between diet and disease, with an indication of some problems of the subject which await elucidation.—G. WILLIAMSON.

BARKER, J. R. (1939). **Blood Plasma Changes and Variations in the Female Bovine Toxaemias.**—*Rep. 13th int. vet. Congr. 1938.* **1.** 245-257. 2 appendixes. [In English: French, German and Italian summaries]. [Reprinted in *Vet. Rec.* **57.** 575-580].

Biochemical analyses of the blood plasma from 300 cases comprising milk fever, acetonaemia, grass tetany, lactation tetany, transit tetany and pregnancy toxaemias have shown that marked deviations of the plasma content in calcium, magnesium, glucose, phosphorus and total acetone bodies have a distinct clinical aspect and provide indications for therapy. Three separate syndromes are recognizable, and in general these can be fairly accurately correlated with the plasma findings, *viz*, (1) reeling, paresis and narcosis with the combination of hypocalcaemia

and hypermagnesaemia ; (2) paddling, paresis and coma with hypocalcaemia and normal magnesium, and (3) hyperaesthesia, tetany and convulsions with hypocalcaemia and hypomagnesaemia. An attempt is made to classify these syndromes according to whether they occur during parturition and the puerperium, anoestrus, oestrus, dioestrus or pregnancy. For example the toxaemias of pregnancy are a repetition of those shown in the puerperium with the raised or lowered values of all the plasma constituents never quite so pronounced. Coincident with the onset of anoestrus the plasma usually shows a lowered magnesium value, no matter whether the case is grass tetany or one of the forms of acetonaemia. Dealing with aetiology, B. suggests that the magnesium content of the plasma throughout any twelve months is consequent upon the climatic conditions prevailing in June of that year. Indications are given for the prevention of hypomagnesaemic, tetany, and therapy is outlined for the disorders discussed.—N. J. SCORGIE.

SJOLLEMA, B. (1938). Over weidediarrhee op zandgrond in den wieringermeerpolder. [**Diarrhoea in Cattle on the Wieringermeerpolder, Holland**].—*Tijdschr. Diergeneesk.* **65.** 1189-1198. 2 tables. [1 ref.] [English, French and German summaries].

In the Wieringermeerpolder, on the farms with a soil of fine sand, a disease occurs which is characterized by a protracted and serious diarrhoea, emaciation, and as a rule by a greyish or sallow discoloration of the black hair. Liver, spleen and blood show a very pronounced impoverishment in copper, but an increase in the iron content. The disease can be cured by administration of copper sulphate. Lack of available iron seems to play no part, but the iron metabolism is abnormal. There is locally a lack of Mn in plants on such farms but S. is satisfied that Mn has no relation to the disease.

It is probable that factors other than lack of copper are involved, factors operating in the pastures but not in the stables. Animals that have suffered from diarrhoea in the pasture recover their general health when put in the stables, but still have a low copper content in the blood. No other deficiency has yet been proved. No lesions giving any clue as to the cause of the disease were found at P.M. examination.

Sheep and goats on these farms are also affected. In goats the same impoverishment in copper could be demonstrated as in cows. It is to be feared that the cattle on these farms will be still more affected in the later generations, and that the offspring will deteriorate in quality unless normal absorption of copper is provided for both in the stable and at pasture.—JAC. JANSEN (UTRECHT).

CHOR, H., & DOLKART, R. E. (1939). **Experimental Muscular Dystrophy in the Guinea Pig. A Nutritional Myodegeneration.**—*Arch. Path.* **27.** 497-509. 3 figs. [Numerous refs.]

The purpose of this study was to investigate the nutritional factors concerned in maintaining the normal structure and activity of skeletal muscle. By feeding g. pigs on various synthetic diets it was found that the skeletal muscles became the seat of coagulative necrosis resembling closely that described by ZENKER in typhoid fever and by FORBUS in pneumonia. Despite the degenerative changes of the muscle fibres, the intramuscular nerves and their terminals remained unaffected. These changes differ from those occurring in skeletal muscle as a result of lesions of the motor nervous system. In such cases there is shrinkage of the fibres and a granular breakdown of the sarcostylic elements with replacement by fibrous tissue and fat. The intramuscular nerves and their endings disappear early in the process.—GWILYM O. DAVIES.

WEMBER, H. (1938). Ueber den Magnesiumgehalt im Harn gesunder Haustiere und einiger lecksuchtkranker Ochsen. [**Magnesium Content of the Urine of Healthy Animals and of Cattle with Pica**].—*Inaug. Diss., Berlin.* pp. 20. 5 tables. [Numerous refs.]

Estimated by McCruden's method, the average amount of Mg in the urine of healthy horses (12), cattle (14), sheep (12), pigs (5) and dogs (10) was 63·79, 13·29, 23·49 and 8·10 mg. respectively per 100 c.c. The horses not only showed the highest content, but also the greatest variation, in spite of the fact that they were fed alike. The small amount excreted in the urine of the cattle is partially accounted for by the proportion which was eliminated in the milk. The variation of the individual sheep and swine, and especially the latter, was smaller than that of the cattle. They were more comparable, however, with regard to size, condition and food intake than the cattle which included cows, both pregnant and otherwise. Dogs showed the least variation in spite of differences in the breed.

Two oxen fed on hay which was known to cause pica excreted markedly more Mg in the urine than did the others.—G. WILLIAMSON.

RUSSELL, W. C. (1939). **Vitamins in the Nutrition of Animals.**—*J. Amer. vet. med. Ass.* **94.** 81-89. 1 table. [2 refs.]

A general account of the subject with no new material.—R. FISHER.

MOURIQUAND, G. (1938). Les facteurs d'inapparence dans les dystrophies alimentaires. Avitaminoses asymptomatiques. [**Asymptomatic Avitaminoses**].—*Pr. méd.* Nov. 23rd. 1729-1730. [6 refs.]

M. discusses the symptomatic and asymptomatic states of certain avitaminoses which may be brought about by various factors, " revelation factors " leading to the typically apparent, symptomatic form, and " non-appearance " factors which modify the avitaminosis, rendering it of asymptomatic form (non-typical). These different stages were shown by experiments on g. pigs, which were fed a scorbutic diet plus evaporated milk partially deficient in vitamin C, and which were given only half the normal allowance of water, controls receiving the same diet with water *ad lib.* Loss of weight ensued due to dehydration and inappetence ; after 12 days a large ration of water was allowed, appetite was regained, weight increased and typical symptoms of scurvy appeared after the 22nd day (dystrophic period), compared with the 12-14 days for the controls. G. pigs killed in the dystrophic period showed no lesion characteristic of scurvy. These experiments thus show that it is possible to produce an asymptomatic avitaminosis C in the same time as the typical symptomatic avitaminosis. M. calls for more careful inquiry into the dietary régime when obscure dystrophic disorders are encountered, and suggests further research into the various physiological " non-appearance " factors (gestation, dehydration, inappetence, old age, etc.) which may influence or create asymptomatic avitaminoses. [See also *V. B.* **8.** 803].—ALFRED EDEN.

STEWART, J., & MCCALLUM, Jennie W. (1938). **" White Scour " in Calves and Related Infections. I. The Significance of the Vitamin A Content of the Colostrum as a Predisposing Factor in the Causation of such Conditions.** —*J. comp. Path.* **51.** 290-295. 1 table. [8 refs.]

During two experiments in 1937-38 the colostrum of 210 cows was examined for vitamin A, and accurate records were obtained of 206 calves. The vitamin A content of the colostrum varied from 2,590 to 59 Blue Units per 100 ml., and appeared to be related to the length of the non-lactating period. Calves born of mothers whose colostrum possessed a vitamin A content of less than 250 Blue Units

per 100 ml. were more liable to these conditions than were those from mothers whose colostrum contained more than 250 Blue Units per 100 ml.—R. FISHER.

SEIFRIED, O. (1938). Die geweblichen Grundlagen der Infektionsbereitschaft bei Vitamin-A-Mangel. [**Conditions of the Tissues which Predispose to Infection in Avitaminosis A**].—*Berl. Münch. tierärztl. Wschr.* November 25th. 720-722. [Numerous refs.]

Experimental investigations show that vitamin A deficiency in fowls favours a high incidence of coryza and pox. Under natural conditions of infection there is a much higher incidence of pox (90%) in birds with lesions of the oral cavity due to vitamin A deficiency than in healthy birds (50-55%). It is probable that lesions of the mucous membrane due to vitamin A deficiency are accompanied by a change in the bacterial flora, comprising a general increase in the bacteria of the mouth (diphtheroids, pasteurella and cocci). The entry of pathogens into the mucous membrane occurs mainly in the preliminary stages of the avitaminosis, which is marked histologically by the replacement of the ciliated epithelium by horny squamous epithelium. These changes make the mucosa more susceptible to bacterial infection.

When the vitamin A has been supplied to hens deficient in it, the scaly squamous epithelial cells retrogress and there is a general restoration of an epithelium which in function and morphology resembles the original epithelium. This process was observed histologically and is described. Therapeutically vitamin A has an anti-infectious action only against local infections of the mucous membrane.
—SASSENHOFF (MUNICH).

MASON, H. C., & SMITH, Margaret E. (1939). **Delayed Prothrombin Clotting Time in Avitaminosis A and Pellagra-Like Chicks.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 583-585. [7 refs.] [Authors' summary copied *verbatim*].

Chicks receiving avitaminosis A and pellagra-like " F " rations failed to show normal prothrombin coagulation time. The plasma prothrombin clotting time was greatly delayed in these avitaminotic chicks without the distinct haemorrhagic tendency of a vitamin K depletion manifesting itself.

I. WORDEN, A. N. (1939). **Vitamin B_2 Deficiency in the Pig.**—*Vet. Rec.* **51.** 539-542. 2 figs. [12 refs.]

II. PICKUP, J. (1939). **Illness of Pigs due to a Food Deficiency. (Possibly One Factor of the Vitamin B_2 Complex).**—*Ibid.* 535-536. [1 ref.]

I. This is a useful summary of recent English work, which has demonstrated the importance in the nutrition of the pig of certain components of the vitamin B_2 complex, *viz*, nicotinic acid, vitamin B_6 (the eluate factor) and the filtrate factor. Particulars are given of the basal diets and supplements used in the experiments, but attention is specially directed to the clinical and pathological findings which are described in detail. Discussing the practical implication of the experiments, W. rightly points out that as commercial rations of unknown composition are widely used for pig feeding in Great Britain, it is unwarrantable at present to exclude the possibility of vitamin B_2 deficiencies occurring under practical conditions. Certain publications are cited in support of this opinion.

II. Marked respiratory and nervous symptoms were observed in 15-week-old pigs after feeding for 10-24 days on a proprietary food, and point is given to the similarity of these symptoms to those recently recorded in pigs maintained upon experimental diets deficient in the eluate factor. On the other hand, a group of 20-week-old pigs continued to thrive on the suspected food, but this is explained

on the grounds that they were older and presumably better able to withstand a deficient diet.—W. R. MUIR.

GREEN, R. G. (1938). "Chasteck'sche Lähme" eine gefährliche Avitaminose des Silberfuchses. [**Chasteck's Paralysis, a Severe Form of Avitaminosis in Silver Foxes**].—*Dtsch. Pelztierz.* **21.** 467-472 and 497-499. 2 figs. [Translated from *Amer. Fur Breeder.* July-Sept. 1938].

Chastek's paralysis of foxes is a vitamin B_1 deficiency. In all reported cases the outbreak has followed feeding with fresh fish; on affected farms numerous deaths suddenly occur during a few days. The disease begins with an unsteady gait; the animals arch their backs like cats and progress in short bounds. After 24 hours they show tetanic paralysis, the limbs being stiffly extended and the head rigidly bent backwards. During this period the sight is not affected. Death may occur either immediately after the appearance of the paralysis, or 24 hours later. The disease is most frequent in the first three months of the year. Autopsy shows severe degeneration of the heart and liver, and cerebral haemorrhage. The histological changes are characteristic of the condition, and are a valuable aid to diagnosis. There are degenerative and inflammatory changes in the liver, and capillary proliferation. In the heart there are degenerative changes and cellular infiltration, and large acidophile inclusion bodies in the cell nuclei of the myocardium; these are probably enlarged nucleoli. The changes in Chastek's paralysis are identical with those found in the brain of dogs affected with vitamin B_1 deficiency. Examination of natural and artificially induced cases showed the role of fresh fish in the diet as the cause of the disease. Fish in itself contains little vitamin B_1, in fact the vitamin B_1 requirement of the organism is increased by feeding fish, since the fish contain oil. If the diet was poor in vitamin B_1 before the feeding of fish, any fish given suddenly would cause this type of avitaminosis.

In one outbreak the disease occurred 20 days after the introduction of fish in the diet, and in another instance the disease was caused by fish-meal, and even more effectively by a large quantity of cod-liver oil. By giving a mixture of milk, liver and yeast the undesirable effects of feeding fresh fish may be avoided.

—SASSENHOFF (MUNICH).

GYÖRGY, P., & GOLDBLATT, H. (1939). **Hepatic Injury on a Nutritional Basis In Rats.**—*J. exp. Med.* **70.** 185-192. 8 figs. on 3 plates. [16 refs.] [Authors' summary copied *verbatim*].

In forty-eight rats kept on a basal diet deficient in the vitamin B complex and supplemented with vitamin B_1 and riboflavin or with vitamin B_1, riboflavin and vitamin B_6, various pathological changes in the liver were observed.

These changes were characterized mainly by parenchymatous and fatty degeneration, focal and massive necrosis, hyperemia and haemorrhage and, in some of the rats, by perilobular and condensation fibrosis. Addition of yeast or Peters' eluate (yeast extract) regularly prevented this hepatic injury. On the basis of the evidence obtained, it is assumed that the liver changes are of nutritional origin and should be correlated to deficiency of a part of the vitamin B_2 complex.

SUBBAROW, Y., DANN, W. J., & MEILMAN, E. (1938). **Effect of β-Aminopyridine in Experimental Black-Tongue.**—*J. Amer. chem. Soc.* **60.** 1510-1511. [2 refs.] [Copied *verbatim* from *Brit. Chem. Physiol. Abstr.* Aug. 1938. p. 676. Signed: R. S. C.]

1 ton of fresh liver yields 150 mg. of β-aminopyridine, which appears to cure acute experimental black-tongue in dogs as well as does nicotinic acid.

BECHDEL, S. I., HILSTON, N. W., GUERRANT, N. B., & DUTCHER, R. A. (1938). **The Vitamin D Requirement of Dairy Calves.**—*Bull. Pa agric. Exp. Sta.* No. 364. pp. 26. 8 figs., 11 tables. [Numerous refs.]

During the first experimental year 1935-1936, data obtained from 18 grade Holstein calves were of little value since the Ca content of the diet was well below the amount necessary for growth and well-being. In the second year, fifteen grade Holstein calves were used, all of them being less than two weeks of age when placed on experiment. All the calves were kept in the dark and maintained on a basal rachitogenic diet for the first 42 days so that any possible vitamin D reserves for the animals would be reduced as nearly as possible to the same level before the addition of the vitamin D supplements.

Irradiated dry yeast and cod-liver oil concentrate were used as the sources of the vitamin D supplement and prophylactic technique was used to determine the U.S.P. unit requirement. The degree of bone calcification was estimated by determining the ash content of, and by the lime test on, a rib bone from each animal; X-ray photographs of the epiphyseal cartilage at the distal end of the ulna were used to make observations of the calcification of the bones of living calves. The blood Ca and P were estimated and discussed but the data are not given. Under the conditions of the experiment the minimum level of vitamin D for growth and well-being and proper calcification of bones was approximately 300 U.S.P. units per day per 100 lbs. live weight for calves from birth to 7 months of age; 135 U.S.P. units per day per 100 lbs. live weight failed to prevent rickets. Irradiated dry yeast and cod-liver oil were found equally effective sources of vitamin D.—R. ALLCROFT.

I. VERSTRAETE, A., & CLOETENS, R. (1937). Over de verhouding van bepaalde bloedcomponenten en enkele klinische bevindingen bij hondenrachitis. **[Blood Changes in Canine Rickets].**—*Vlaam. Diergeneesk. Tijdschr.* **6.** 220-236. 5 tables. [9 refs.] [English, French, and German summaries].

II. VERSTRAETE, A., & CLOETENS, R. (1937). De serumphosphatase in rachitis bij honden. **[Serum Phosphatase in Canine Rickets].**—*Ibid.* 257-268. 4 tables. [9 refs.] [English, French and German summaries].

I. The authors studied the blood Ca and P of puppies affected with rickets encountered in general practice. Slight variation with, however, little deviation from the normal was found in the blood Ca. There was no fall in the blood P.

II. It is stated that although the phosphatase content of the serum of 18 of 24 puppies with rickets showed a certain increase, no parallel could be established between the amount of this enzyme and the severity of the disease, except in very severe cases. Treatment with ultra-violet rays and vitamin D brought about a definite improvement in the condition of the puppies, accompanied by a decrease in the phosphatase content of the serum.

VAN NIEKERK, J., & FRANKEN, F. (1938). Hypervitaminosis-D durch grosse Gaben tierischen, antirachitischen Vitamins an Küken. **[Hypervitaminosis-D in Chickens].**—*Acta brev. neerl. Physiol.* **8.** 13-16. 3 tables. [1 ref.]

The preparation of an antirachitic vitamin of physiological activity equivalent to that in cod-liver oil by eradication of provitamin D from animal sources has afforded the opportunity to study hypervitaminosis D in chickens. Mashes containing 5,000-500,000 I.U. per 100 g. were fed to day-old and 6-week-old chickens. With increasing dosage, growth, as indicated by live weight measurements, was progressively impaired in chicks, while older birds actually suffered loss in weight. Pathological findings are reserved for later publication.—W. R. MUIR.

REMP, D. G., & MARSHALL, I. H. (1938). **The Antirachitic Activity of Various Forms of Vitamin D in the Chick.**—*J. Nutrit.* **15.** 525-537. 1 fig., 1 table. [Numerous refs.]

A comparative bio-assay of pure crystalline vitamins D_2 and D_3, a standard cod-liver oil, an irradiated cholesterol, and viosterol in oil was carried out on the rat by the curative line test and on chicks by a prophylactic test on the basis of gain in body weight and width of the metaphysis, compared with positive controls, taking bones with 3 + index of calcification and 45% or more ash as normal.

The vitamin D_2 and D_3 preparations had the same potency per g. for rats. The forms tested fell into two groups, functioning slightly differently in the chick. Viosterol and vitamin D_2 were much less effective in the chick, rat unit for rat unit, than the other preparations. It is suggested that they are only slowly or incompletely converted to a form utilizable by the chicken, while this takes place readily in the rat. The results also showed that cod-liver oil and vitamin D_2 in the chick could not be safely compared without considering the ash value of the bone.—E. I. MCDOUGALL.

PUBLIC HEALTH

THOMAS, M. (1939). Sur un procédé de recherche du Bacille tuberculeux dans le lait. [**Method of Isolating Tubercle Bacilli from Milk**].—*C. R. Soc. Biol. Paris.* **130.** 512-514.

Milk is added to an ammonia-alcohol mixture, stored for two hours and centrifuged for one hour at 5,000 r.p.m.

The method separates the fats, stabilizes the casein by converting it into ammonium caseinate which is soluble in milk whey, kills most of the contaminating bacteria and produces a minimum deposit which with the amounts used can all be examined on two slides. If required for cultural or animal tests the deposit must be neutralized.—C. V. WATKINS.

I. STRYNADKA, N. J., & THORNTON, H. R. (1937). **The Accuracy of the Direct Microscopic (Breed) Count of Bacteria and Leucocytes in Milk.**—*J. Dairy Sci.* **20.** 685-692. 4 tables. [5 refs.]

II. BARKWORTH, H., & IRWIN, J. O. (1938). **Distribution of Coliform Organisms in Milk and the Accuracy of the Presumptive Coliform Test.**—*J. Hyg., Camb.* **38.** 446-457. 7 tables. [15 refs.]

III. ZINN, E. (1938). Die Bestimmung des Keimgehaltes der Milch mittels der Methylenblaureduktase- und der Reduktaseprobe mit Azurufin. [**Determination of Bacterial Content of Milk by the Methylene Blue Reductase Test and the Reductase Test with Azurufin**].—*Tierärztl. Rdsch.* **44.** 421-424. 4 tables. [5 refs.]

IV. FLEISCHHAUER, G., GEBAUER, B., & VON HAYN, L. (1937). Zur Untersuchung roher und erhitzter Milch auf " mikroskopisch nachweisbaren Eiter ". [**The Examination of Raw and Heated Milk for " Microscopically Demonstrable Pus "**].—*Berl. tierärztl. Wschr.* Dec. 3rd. 746-747. [4 refs.]

I. The authors have made extensive microscopic examinations of some 34 samples of milk of relatively low count drawn from the udder—a mixed sample from the four quarters—with sterile precautions, with the object of studying the variability of the Breed count under such conditions. A comparison was made of the results obtained by 50 field, 1,000 field, 2,000 field and in two cases, 6,000 field examinations, the examinations being in many cases replicated.

It is concluded that the ratio of the highest to the lowest of replicate 50 field direct leucocyte counts may be expected to be not greater than 3:1, this being regarded as indicating reasonable accuracy.

For bacteria, on the other hand, the high/low ratio of 60, 1,000 field and 2,000 field (few only) counts on the same sample was greater than 4:1 in 16 (72·7%) and greater than 8:1 in 12 (54·5%) of 22 milk samples, these results being regarded as indicating that the 50 field count for bacteria is not of reasonable accuracy. The high/low ratios of replicate 6,000 field bacterial count, *i.e.* the whole film from 0·01 c.c. of milk, were 3·29:1 and 2·36:1 respectively for two milk samples examined. The conclusion is drawn that 0·01 c.c. may not constitute a sample which is representative enough for the precise estimation of the bacterial population.

It is suggested that the number of fields examined should always be stated unless the milk is of high bacterial content.

II. The object of the work described was to estimate the accuracy of the present coliform test before comparing this with a modification.

The presumptive coliform test was carried out following the standard procedure (Ministry of Agriculture 1934) by each of three workers, at each of four dilutions, on seventeen sets of five tubes for each of seven samples of 18-hour-old afternoon milk which had been held overnight at 32-40°F., *i.e.* for each sample 51 sets of five tubes were made at each of the four dilutions. With the exception of three slightly anomalous results, the data were consistent with the hypothesis that the chance of a tube remaining sterile is constant for all tubes inoculated from the same sample of milk at any one level of dilution. The assumption of a Poisson distribution of organisms in parallel tubes is accurate enough, according to these data, to give a good idea of the number of bacteria per ml. There was, however, a tendency for the estimated count to rise at higher dilutions, and this was more marked in these experiments in autumn than in spring. This is believed to be due to breaking up of clumps.

III. Z. has made a comparison of methylene blue and azurufin as indicators in the reductase method of estimating the keeping quality of milk. In all 206 samples were examined by both methods. He concluded that azurufin is to be preferred because results can be read much more quickly, *viz*, in 40-60 minutes instead of 5½ hours. Samples which are still blue after 40 minutes are classed as 1, those which are still blue-violet as 2, those which are red-violet as 3, and those which are pale rose or decolourized as 4. He also finds the test more sensitive than the methylene blue test, more samples falling into classes 1 or 4, and less into classes 2 and 3. Care is needed, however, in ensuring proper time intervals on account of the speed with which the colour changes occur in all but the best quality samples.

IV. The authors, as a result of the microscopic examination of 228 samples of raw or heated milk, express their preference for Breed's method as opposed to Skar's method for the examination of the bacterial and cellular content of whole milk. They find it takes less time and that more cells and streptococci are found. They believe that any milk which shows one chain of phagocyted streptococci per slide (*i.e.* 0·05 ml. whole milk spread over 5 sq. cm.) should be classed as containing "microscopically recognizable pus" under the German regulations for milk control.—A. W. Stableforth.

Bartel. (1939). Wie kommt die Intoxikation durch Breslau-Bakterien beim Menschen zustande? [*Salmonella typhi-murium* **Infection in Man**].—*Tierärztl. Rdsch.* **45.** 416-417. [Also appeared in *Berl. Münch. tierärztl. Wschr.* June 9th. 371].

The question is raised as to how bacteria such as *S. typhi-murium* and

S. enteritidis and its variants produce illness in man. It is pointed out that the symptoms of " food-poisoning " produced are not associated with a septicaemia, as in infection with some other of the salmonella which cause typhoid and paratyphoid fever. The actual pathogenesis is not clear, but experiments show that the bacteria mentioned have toxic fractions which are also present in the dead bacteria. The fractions are filtrable. The material is toxic by parental administration to laboratory animals (mice, rabbits and g. pigs), but not by feeding. It is stated that the toxic material which is liberated after the death of the bacteria is diminished under the influence of the stomach contents of the laboratory animals mentioned, but not by the stomach contents of man. It is assumed that in man the bacteria taken in with the food are largely killed by the acid of the stomach, and that the toxic fraction is liberated and absorbed by the intestinal mucosa, thus producing the symptoms associated with " food-poisoning ". [No details are given, and without them it is difficult to assess the value of the statements, but it is still not clear why in man some salmonella produce " food-poisoning " with a short incubation period and short illness, whereas other members of the same group, often possessing similar though not the same antigens, produce a continued fever of long duration and with a long period of incubation].—R. Lovell.

Becker. (1939). Ueber Suipestiferfunde bei der bakteriologischen Fleischuntersuchung. [*Salmonella cholerae-suis* **in Bacteriological Meat Inspection**].—*Z. Fleisch- u. Milchhyg.* **49.** 163.

Salmonella cholerae-suis was detected eight times in unusual circumstances in the course of seven years. In 1927 five cases occurred in cattle in one week (metritis and enteritis); four of these belonged to one owner. Four years later another case was observed in a cow belonging to the owner of one of the previous cases. A further case concerned a slaughter horse with a purulent infection of the shoulder, and one case was a pig with a purulent wound caused by a stable fork injury, with subsequent abscesses in the lungs, and enteritis. All the reported cases were detected after emergency slaughter.—V. Chládek (Prague).

Lerche, M. (1938). Möweneier als Ursache von Lebensmittelschädigungen. [**Food Poisoning from Sea-Gulls' Eggs** (*Salmonella typhi-murium*)].—*Tierärztl. Rdsch.* **44.** 713-714.

Cases of sickness and diarrhoea amongst some soldiers of a coastal battery at a North Sea island followed their spare time occupation of searching for sea-gulls' eggs. When the order was given forbidding the searching for and the eating of these eggs there were no more cases of a similar illness.

It is known from the work of Dutch bacteriologists that sea-gulls may become infected with *S. typhi-murium*; there is an association between sea-gulls and the ducks on farms near the coast, and infection of ducks with salmonella is well-known. L. records the examination of 57 sea-gulls' eggs; presumably they were bought and not from the island where the sickness had occurred. *S. typhi-murium* was not isolated from them. Experiments were made to estimate how long *S. typhi-murium* would live in the eggs of sea-gulls during cooking, to ascertain the danger of raw or imperfectly cooked eggs. Boiling for eight minutes was sufficient in the small number of experiments made; sea-gulls' eggs require boiling for 10-15 minutes on account of the nature of the egg-white.—R. Lovell.

I. Bahr, L. (1938). Einige experimentelle Untersuchungen speziell an Wanderratten (Epimys norvegicus) mit " Ratin " and " Ratinin " (1907-1938.) [**Experiments on Rats** (*Epimys norvegicus*) **with " Ratin " and " Ratinin "**

(1907-1938].—*Z. InfektKr. Haustiere.* **54.** 44-56. 1 table, 2 graphs. [Numerous refs.]

II. BAARS, G. (1939). Einige experimentelle Untersuchungen speziell an Wanderratten (Epymis norvegicus) mit " Ratin " und " Ratinin " (1907-1938) von Direktor Dr. L. Bahr, Kopenhagen (mit 2 kurvischen Darstellungen). [**Experiments on Wild Rats with " Ratin " and " Ratinin " (Commenting on I)**].—*Ibid.* 255-256.

I. B. relates his experiments with two different strains of " Ratin ", which is used for the destruction of rats and mice and is a salmonella. It is probably serologically identical with *S. enteritidis* var. *danysz*. The studies cover a period of 31 years and it is shown by curves that the virulence has not varied greatly over that period. One strain, " Ratin " 3513, has been used on 18,464 rats, of which 11,219 (60·8%) died, whilst a higher mortality, namely, 90%, was experienced with another culture known as " Ratin " 690. From 1913 to 1938, with the exception of the year 1918, there are also records of the results obtained by giving the chemical preparation " Ratinin " which is a squills compound. In 2,696 trials involving 5,764 rats of different kinds there was a mortality of 96·6%.

Following the article there is reprinted the regulations for the destruction of rats in Denmark, after which there is a statement regarding the role played by the rat in Weil's disease. It appears that from 1923 to 1937 there were 24 human cases of Weil's disease, and 6 deaths, and during 1934-35 spirochaetes were found in the urine of 24 out of 100 rats examined.

II. BAHR [see I above] has claimed that his strains of the " Ratin " variant of *Salmonella enteritidis* are relatively fatal for wild rats and that, especially with the addition of " Ratinin ", they are of value for the destruction of rats and mice. In his article he refers to the work of the author of the present article, who has not been able to confirm all BAHR's work, and concludes that Baars must have been working with immunized rats. In the present article the author records work involving the use of water rats and other wild rats fed with cultures of *S. enteritidis* (the original Jena type), *S. enteritidis* var. *dublin* (the Jensen type) and *S. enteritidis* var. *danysz*. Of the latter type there are several strains which he used, including a " Ratin " culture. His experiments, although only a few rats were used, failed to confirm the high mortality recorded by BAHR, and he also points out that in his opinion there is some danger in using such methods for the destruction of rodents. Cultures may be spread on human food and on the stalls of animals. It is a method now forbidden in Germany [see *V. B.* **7.** 352].—R. LOVELL.

THERAPEUTICS

I. BERTHELON, M., & BRIVOIS, P. (1939). Action d'un dérivé sulfamidé sur quelques staphylococcies animales. [**Action of Sulphamide Derivative on some Animal Staphylococci**].—*Rec. Méd. vét.* **115.** 337-343. 7 tables. [5 refs.]

II. HEMMENS, Elizabeth S., & DACK, G. M. (1939). **The Effect of Sulfanilamide on Experimental Infections with Bacterium necrophorum in Rabbits.**—*J. infect. Dis.* **64.** 43-48. 3 figs., 2 tables. [1 ref.]

I. Soluseptasine was injected in doses of 0·5 g. for dogs, 1·5 g. for sheep and 3 g. for cattle every day or every second day for a period of 10 days; the first injection was intravenous, the later injections subcutaneous. Beneficial effects are said to have been produced in acute mammary and uterine infections. No effect was produced in subcutaneous staphylococcal infections in dogs [nature of

lesion not clear]. *In vitro* and biological investigations showed that the drug has more action on the staphylococcal exotoxin than on the endotoxin or the coccus itself. *In vitro* soluseptasine retards the growth of pathogenic staphylococci and decreases their haemolytic properties.

II. Rabbits injected with *Fusiformis necrophorus* received 0·5 g. of sulphanilamide in gelatine capsules twice daily by the mouth. This stopped the spread of the necrotic process, and the lesion ultimately became completely encapsulated. In order to produce maximum effect and cure it was necessary to start treatment by the third day of the infection or earlier, and to continue treatment until the lesion had regressed.—J. M. Robson.

Hawking, F., Hennelly, T. J., Wales, W. T., Chinnick, W., & Barrett, R. E. (1938). **Trypanocidal Activity and Arsenic Content of the Cerebrospinal Fluid After Administration of Arsenic Compounds. II.**—*J. Pharmacol.* **64.** 146-163. 4 tables. [14 refs.] [See also *V. B.* **8.** 44].

A second series of compounds was examined by administering them to patients and then determining the trypanocidal activity and arsenic content of the cerebrospinal fluid. Only one compound, As 190, appeared approximately equal to tryparsamide and worthy of further clinical study. Sulpharsphenamine was inferior to tryparsamide. The other compounds examined, *viz*, the pentavalent arsenicals, stovarsol, solvarsin, acetylarsan and parosan, the trivalent arsenical K 352, and the antimonial, neostibosan, all failed to produce definite trypanocidal action. In a small proportion of the patients, mostly cases of general paresis, the cerebrospinal fluid possessed a slight trypanocidal activity *in vitro*, independent of the administration of drugs.—J. M. Robson.

Bower, J. O., Burns, J. C., & Mengle, H. A. (1938). **Prontosil and the Treatment of Spreading Peritonitis in Dogs.**—*J. Lab. clin. Med.* **24.** 240-244. 1 table. [2 refs.]

The appendix was ligated in two groups of dogs under ether anaesthesia and castor oil was administered immediately after the operation, in order to produce appendicitis ; peritonitis developed. One group received eight-hourly intramuscular injections of prontosil until death or recovery : 50% of these animals died. The second group received no treatment and the mortality of this group was 92%.
—J. M. Robson.

De, S. P., & Bäsu, U. P. (1938). **Chemotherapeutic Study of Streptococcal Infections.**—*Indian J. med. Res.* **26.** 537-540. 3 tables. [9 refs.] [Authors' summary copied *verbatim*].

The replacement of the amide hydrogen of p-amino-benzene-sulphonamide by 8-quinolyl, 6-methoxy-8-quinolyl, or δ-diethyl-amino-butyl group, each of which is known to enhance the physiological activity of a chemotherapeutic compound, does not help in the increment of the bacteriostatic property of sulphonamide ; on the contrary, it increases the toxicity of the compound.

Haalck, O. (1937). Spülungen und Infusion mit Entozon B an gesunden und kranken Eutervierteln. **[Infusion of Healthy and Diseased Udders with Entozon B].**—*Inaug. Diss., Hanover.* pp. 93. 1 chart. [Numerous refs.]

From a small number of experiments on three cows, H. concludes that, judged by the depression of milk yield, the irritant properties of the original entozon, entozon A and entozon B (the newest form of entozon) are as 6·5 : 7 : 3·5. He finds that the disturbance caused by entozon B is not serious until a concentration of

1 : 250 is reached, and is then approximately similar to that produced by the original entozon at 1 : 500 or 750. Entozon A could not be safely used at a concentration above 1 : 1,500. Recovery of milk yield proceded in a linear manner 24 hours after entozon B at all concentrations from 1 : 250 downwards.

Out of 16 cases of catarrhal mastitis of various aetiology, 10 were cured. None of five " septic " cases associated with *Bact. coli* was cured, but in four the general symptoms were alleviated. Cases were classified on a clinical basis and no details are given of the methods used to determine the aetiology of the cases.—A. W. S.

MORGAN, E. (1939). **Mal-de-Caderas in Venezuela (Synonym Derrengadera).**—*Vet. J.* **95.** 178-179.

Although the lives of horses affected with *Trypanosoma equinum* infection may be prolonged on occasion by the use of either naganol, tartar emetic, or antimosan, there is as yet no reliable curative treatment for the disease. Naganol, however, has proved successful as a prophylactic in doses of 1 g. repeated at intervals of three months. It is claimed that the treatment is 100% effective.—D. D. O.

LOURIE, E. M., & WARRINGTON YORKE. (1938). **Studies in Chemotherapy. XX. The Preparation of Strains of Trypanosomes Resistant to Synthalin and Undecane Diamidine, and an Analysis of their Characters.**—*Ann. trop. Med. Parasit.* **32.** 201-213. 6 tables. [8 refs.] [See also *V. B.* **9.** 273.]

The production, in mice and rabbits, of strains of *Tryp. rhodesiense* resistant to synthalin and undecane diamidine is described, the process being very slow and requiring about four months before the peripheral blood is no longer freed from trypanosomes by a minimum curative dose. The authors state that in working on the development of drug resistance in trypanosomes they have encountered four different types.

1. Resistance to aromatic arsenical and antimonial compounds and to acriflavine. This type of resistance can be easily produced, the trypanosomes being still sensitive to Bayer 205 and guanidine compounds.

2. Resistance to tartar emetic. This can only be produced in strains which have already been rendered resistant to aromatic arsenicals or antimonials or to acriflavine.

3. Resistance to Bayer 205. This resistance can only be produced slowly, and resistant strains remain sensitive to aromatic arsenicals or antimonials and to guanidine compounds.

4. Resistance to amidine and guanidine compounds. This can only be produced slowly, and resistant strains remain sensitive to the aromatic arsenicals and antimonials and to Bayer 205.—U. F. RICHARDSON.

MOGLIA, G. (1937). Sulla terapia delle tripanosi sperimentali (tripanosoma Pecaudi). [**Treatment of *Tryp. pecaudi* Infection in Donkeys**].—*Profilassi.* **10.** 201-202. [English and German summaries].

A brief note claiming good results in chemotherapy, without giving any details.

HONESS, R. F. (1939). **The Effect of X-Ray on the Coccidia of the Rabbit.**—*Science.* **89.** 486.

X-ray skin dosage of 450 r. at 70 kvp. acts on intracellular stages of rabbit *Eimeria* stopping oocyst production completely for from 5-7 days. In the relapse which follows, oocyst production varies but never reaches the same volume as before X-ray treatment. The gametocytes are evidently more susceptible than the asexual stages.

ENDREJAT, E. (1938). Zur Behandlung der Schafbabesiellose mit Akaprin. [**Treatment of Ovine Babesiasis with Acaprin**].—*Tierärztl. Rdsch.* **44.** 60.

In continuation of a previous report [*V. B.* **8.** 142.] E. here claims success in the treatment of sheep with severe clinical piroplasmosis by subcutaneous injections of 5% acaprin as sold, diluted ten times in water, in doses of 2-5 c.c. for sheep and 0·5-1·0 c.c. for lambs. In Iran in 1937, 2,846 (97%) affected sheep were cured out of 2,935 treated.—J. E.

LENFERS, H. (1937). Untersuchungen über insektenabwehrende Mittel. 1. Beitrag: Insektenmittel 206 Dr Utzel. Insektenmittel D.V.50 Phönix. [**Trials of Insecticides: (a) " 206 Dr Utzel " and (b) " D.V.50 Phoenix "**]. —*Inaug. Diss., Hanover.* pp. 39. [Numerous refs.]

L. states that " 206 Dr Utzel " has been found to be useful in protecting horses, cattle and other domestic animals against flies. It is composed of an emulsion of aluminium, resin, and " lime soap ", with a small amount of heavy naphthalene derivatives and some bitter principles. It is not poisonous to animals, and not an irritant. Its effect lasts for 3-4 days on housed animals, and for 2 days on animals at pasture. The " D.V.50 Phoenix " preparation was not satisfactory.

HIYEDA, K., & TERADA, B. (1939). **A New Anthelmintic " Raigan " for Taeniasis.**—*J. Parasit.* **25.** 183-184.

" Raigan " is an old Chinese remedy prepared from a kind of mushroom (*Omphalia lapidescens*). Over 100 persons infested with *Taenia saginata*, *T. solium*, *Hymenolepis diminuta*, and *H. nana* were successfully treated with doses of 20 g. of powdered " raigan ", three times a day for three successive days. As no segments of *T. saginata* or *T. solium* were passed within four months after treatment it is believed that the worms were completely destroyed. Results with *Hymenolepis* were less definite, but " raigan " caused a cessation in egg production.

OBITZ, E., & WADOWSKI, S. (1937). Przyczynki do zwalczania pasożytów zwierząt domowych w praktyce. [**Control of Helminth Parasites of Domestic Animals**].—*Pam. pańs. Inst. nauk. Gosp. wiej. Puławy.* **1.** 85-97. 1 table. [Numerous refs.] [English summary]. [Suppl. to *Wiad. weteryn.* **16.**]

The following drugs are said to have been successful in the treatment of the conditions mentioned :– an aqueous or an aqueous and glycerin solution of iodine for intratracheal injection against lungworms in sheep; a mixture of carbon tetrachloride and liquid paraffin (1:5) subcutaneously for fasciolosis in sheep; the South African wireworm remedy for intestinal parasites in sheep. 1% copper sulphate and a mixture of copper sulphate and nicotine sulphate were not so effective against the latter. For ridding fowls of lice pyrethrum powder was most effective, and the following preparations were progressively less effective :– sodium fluoride, flower of sulphur, and black mercury ointment.

—V. CHLÁDEK (PRAGUE).

POISONS AND POISONING

SMITH, M. I., WESTFALL, B. B., & STOHLMAN, E. F. (1938). **Studies on the Fate of Selenium in the Organism.**—*Publ. Hlth Rep., Wash.* **53.** 1199-1216. 8 figs., 7 tables. [8 refs.]

When Se in inorganic form is intravenously injected into animals, it is slowly eliminated from the blood stream by selective absorption, mainly by the liver and

kidneys, to be slowly excreted in the urine. Organic Se (*i.e.* as it occurs naturally in food) is better retained by animals chronically poisoned than inorganic Se, as evidenced by the level of urinary excretion and by tissue analysis. Se continues to be excreted for about a month in the urine of animals following a three or four month period of chronic poisoning by inorganic Se, and for at least six months after poisoning by organic Se. Se stored in the tissues following chronic organic Se poisoning is mainly combined with protein, the non-protein portion probably representing the end product or products of metabolism. Following acute poisoning with inorganic Se, the Se in the blood and kidney is in non-protein combination, but is in protein combination in the liver. Following subacute poisoning with inorganic Se, there was a suggestion that a Se-protein complex existed in all tissues, especially the liver.

Little, if any, urinary Se is in volatile form and recoverable quantitatively by simple distillation with a Br_2-HBr-H_2SO_4 mixture, suggesting that it consists of a relatively labile organic combination. Following chronic organic Se poisoning, very little of the element is found in inorganic form in the urine, but in animals acutely poisoned by intravenous injection with inorganic Se, as much as 50% of the urinary Se may be inorganic. In subacute poisoning with inorganic Se following oral administration, inorganic Se is demonstrable in the urine, but not uniformly so.—ALFRED EDEN.

CLARK, A. (1939). **A Preliminary Note on the Inhibitory Effects of Chronic Poisoning by Foods Containing Cyanic Substances.**—*J. trop. Med.* (*Hyg.*). **42.** 65-72. 7 figs. [Numerous refs.]

A general speculative article including personal observations of the author, dealing particularly with the prussic acid content and toxicity of cassava, and attributing effects to " chronic cyanic poisoning ". [The discussion has no critical value, traces of HCN being credited with hindrance of nearly all metabolic activities, including those associated with glutathione, cytochrome, deaminase, phosphatase, vitamins A, B and C, and nicotinic acid.

The toxic effects of cassava or manihot, *i.e.* tapioca root or Pava arrowroot, are generally attributed not to the small amount of cyanogenetic glucoside present but to a toxalbumen, " manihotoxine ". Most " sweet " varieties of the root contain less than 0·005% HCN, and can be eaten with impunity. The " bitter " varieties may contain ten times as much HCN, but also contain an acrid milky juice highly poisonous in the raw state, varying amounts of " manihotoxine " and an antiseptic gum marketed as " cassaripe ". In the manufacture of tapioca starch from bitter varieties, toxic substances are eliminated in the process of heating, washing and drying].—H. H. GREEN.

WHITE, E. G. (1939). **The Effect of Carbon Tetrachloride on the Liver of the Pig, with Especial Reference to Experimental Cirrhosis.**—*J. Path. Bact.* **49.** 95-103. 8 figs. on 2 plates, 1 table. [11 refs.]

Pigs aged from 3½ to 9 weeks were injected with varying amounts of CCl_4 subcutaneously, and the histological picture of the liver was studied after varying intervals of time. A dose of 0·6 c.c. per kg. body weight usually induced no clinical symptoms, but there was necrosis of the centre half of each lobule with repair of the tissue complete within a week. Considerable individual susceptibility to CCl_4 poisoning was noticed, and as little as 0·2 c.c. per kg. was sufficient to induce death within 12 hours in some cases.

The chronic effect of small doses of CCl_4 subcutaneously at four or five day intervals was shown to be cirrhosis of the liver, being most severe following 36

injections of 0·2 c.c. per kg. and less so with 28 doses of 0·1 c.c. per kg. and with 26 doses of 0·05 c.c. per kg. The cirrhosis was characterized by subdivision of the lobules into smaller groups of liver cells by collagen and by precollagenous reticulum. The pathogenesis of this process was studied by removal of small pieces of liver at various intervals by laparatomy under nembutal anaesthesia and finally by P.M. examination. No ascites, icterus nor splenomegaly was observed. These cirrhotic lesions appear to resemble closely the naturally occurring lesions found in the pig.—ALFRED EDEN.

PHYSIOLOGY

ANON. (1939). **Some Problems of Gastric Secretion.**—*Brit. med. J.* July 22nd. 175-177. [15 refs.]

The injection of insulin in man is followed, after a latent period, by a flow of gastric juice, but if glucose is simultaneously injected no gastric response occurs, showing that the hypoglycaemia and not the insulin is the secretogogue. Gastric response to hypoglycaemia is abolished by vagotomy and it is suggested that the hypoglycaemia test is worthy of an extensive clinical trial, although it is improbable that hypoglycaemia is a normal mechanism regulating gastric secretion.

Extracts of pyloric mucosa (" gastric secretin ") stimulate gastric secretion although the actual hormone involved is unknown ; histamine has been suggested although the action of this substance is so wide-spread that it is doubtful whether this is the chemical linkage between pyloric and fundic mucosae.

A histamine-free acid extract of the pyloric mucosa has been shown to act in the manner of " gastrin " although it had a negligible effect on bile and pancreatic secretion. There is need of evidence of the appearance of a gastric secretogogue in the blood at the height of normal gastric digestion. Normal gastric juice contains a substance indistinguishable physiologically from histamine although the identity of " gastrin " and histamine is doubtful. The diet also has a complex influence on gastric secretion and the known effects of fat, glucose and protein are considered. It is suggested that gastric juice contains factors necessary for the maintenance of a normal state of the C.N.S. and the skin, since removal of the stomachs of young pigs results in anaemia and a pellagra-like condition, incurable by large doses of vitamins A, B, C and D, but responding to stomach extracts and to whole gastric juice.—ALFRED EDEN.

WHITE, E. G. (1939). **Some Observations on the Liver of the Pig : The Hepatic Lobule and Liver Cell during Post-Natal Growth.**—*J. Anat.* **73.** 365-386. 4 figs. on 1 plate, 6 tables, 2 charts. [16 refs.]

W. studied the size and number of the hepatic lobules of the pig during growth, and the process which brings about increase in size of the liver after birth. Liver samples were taken from pigs by partial hepatectomy so that two or three samples from the same pig at different ages could be obtained. In addition 50 samples from other pigs of varying ages were examined.

Thirty-five estimations of the diameter of the liver lobule were made on 26 animals. It was found that the diameter of the lobule increased in size from 370μ at 5 days, to 1,550μ at 297 days.

The number of liver lobules was estimated in two ways, first by maceration of the specimen and subsequent teasing out of the lobules which were directly counted, and secondly by calculation, assuming the lobules to have a uniform theoretical shape. The results obtained by the first method were a mean of

490,000 and by the second a mean of 450,000. No increase in the number of lobules could be demonstrated later than five days after birth, the age of the youngest sample.

In the new-born pig there were no definite hepatic lobules ; the collagenous septa separating the lobules were not complete until 45-60 days after birth. Mitosis was common in the liver of young pigs, being especially active 1-7 days after birth. The mitotic index varied from 0·0 in the adult to 4·7 in a one-day-old pig. The number of binuclear cells varied from 1·34% in the new-born pig to 11% in the adult.—A. T. PHILLIPSON.

LUDOLPH, A. (1938). Der Glutathiongehalt des Blutes bei den verschiedenen Haustieren. [**Glutathione Content of Blood in Various Domestic Animals**]. —*Inaug. Diss., Berlin.* pp. 19. 9 tables. [Numerous refs.]

Using the potassium iodide titration method, L. estimated the total glutathione content of blood from horses, cattle, sheep, pigs and dogs. Wide fluctuations were found in each case ; thus in 10 horses the values varied between 15·3 and 39·24 mg. %. The average was 30 mg. % for all animals examined. Breed and sex appeared to have no influence, but in each species there was a definite reduction in the glutathione content of the blood as age advanced.—J. A. NICHOLSON.

WEAKLEY, C. E., Jr., & DUSTMAN, R. B. (1939). **Bilateral Variation in the Weight and Composition of the Long Bones of Some Experimental Animals.**— *J. agric. Res.* **58.** 711-716. 3 tables. [4 refs.]

These experiments, conducted on 20 rats, 20 chickens, 19 pigs and 2 heifers, demonstrate that although differences are quite small, bones may vary in composition and properties. It was noted that the heavier the bone, the greater the water content and the lower the ash, and *vice versa.* In the two heifers examined the heavier bones were on the right side ; in the chicken and pig the reverse was the case. The effect of breed and sex is negligible.—C. W. OTTAWAY.

OTTE, W. (1938). Die Frühdiagnose der Trächtigkeit bei der Kuh und Stute. [**Early Diagnosis of Pregnancy in Cows and Mares**]. pp. 33. 2 tables. [Numerous refs.] Jelgava, Latvia. [8vo] [In German].

A method was worked out by which the presence of prolan and oestrogenic substances in the urine can be demonstrated chemically. The urine is filtered and 10 drops of 3% ammonium molybdate is added to 5 c.c. After a few minutes a green colour develops if oestrogens are present. The urine is next shaken up with acetone, and the precipitate is filtered off, washed with 95% alcohol, dried and extracted with water. This extract contains prolan and water soluble oestrogens. The former can be demonstrated by uranyl-sodium bicarbonate or phosphotungstic acid, and the latter by ammonium molybdate solution. Some concentrated sodium bicarbonate solution is added to the filtrate and the precipitate filtered off, washed with acetone, dried and weighed. This precipitate contains the remaining oestrogenic substances ; the weight gives a rough indication of the amount present, and the precipitate can be further analysed if desired. The tests do not appear to be specific in the cow as in the mare ; work temporarily increases the amount of prolan in the urine, and in the cow the amount of oestrogens increases after eating. The results of examination of 100 cows and 50 mares are given in tabular form ; the tests for prolan are reliable in the mare but useless in the cow. Molybdate tests gave promising results in the cow and form the basis for future work. —A. T. PHILLIPSON.

I. BÜLBRING, E. (1937). **The Standardization of Cortical Extracts by the Use of Drakes.**—*J. Physiol.* **89.** 64-80. 4 figs., 8 tables. [5 refs.]

II. ANON. (1938). **Cyclic Variation in Response to Injected Oestrone.**—*Lancet.* **235.** 1009. [2 refs.]

I. Adrenalectomy is rapidly fatal to birds, the main symptoms being rapid respirations and sudden death in convulsions 6-20 hours after the operation. Injections of cortical extracts were found to prolong the life of the birds, which suggested that they might be used as test animals for the standardization of such extracts. The operation is more easily performed in ducks than in other birds, and drakes are preferred, as in females the adrenal glands are obscured by the ovary. The technique of the operation is described in detail.

It was found that following intramuscular injections repeated at hourly intervals, drakes could be maintained in normal health, but died as soon as the extract was withheld. Large doses at longer intervals did not maintain health, which indicates that the hormone is rapidly excreted or destroyed in the body.

For standardization purposes, a batch of 10 adrenalectomized drakes are injected at hourly intervals for 20 hours with the extract to be examined, and the mean survival time of the birds compared with that of a control batch of drakes injected with a standard hormone preparation. This enables the potency of one extract to be compared with that of another. The standard deviation of the ratio of potency is 22·6%.

II. Several workers have reported that the sensitivity of animals to injected hormones varies throughout the year. Thus, the amount of cortical extract sufficient to keep adrenalectomized drakes alive for a given period is three times greater in May than in July. Seasonal differences in the response to androgens and oestrogens have also been reported. Light appears to be the principal factor concerned in this phenomenon.—J. A. NICHOLSON.

TECHNIQUE AND APPARATUS

SCHALM, O. W., & HARING, C. M. (1939). **A Method of Preparing Bovine Udders for the Study of the Pathology of Mastitis.**—*J. Amer. vet. med. Ass.* **94.** 372-373. 2 figs.

It is pointed out that to obtain a further knowledge of mastitis, a study of the gross and microscopic structure of normal and diseased mammary glands is required. The udder is removed and milked out, and each mammary half is injected through the pubic artery with 20% formalin until formalin escapes from the large vessels. The duct system is then injected *via* the teat. The injected udder is stored in 10% formalin until hardened. The halves of the udder are then separated along the median line, and trisected by cutting through each teat and the middle of each quarter. Each portion is then cut into slices 3-5 mm. thick with a meat slicer, wrapped in cheese cloth and stored in formalin. The slices of udder tissue can then be studied in detail and sections prepared.—J. F.

MILLER, W. T., & JOHNSON, H. W. (1939). **Differential Staining of Sections of Unpreserved Bovine Udder Tissue Affected with Mastitis.**—*Circ. U.S. Dep. Agric.* No. 514. pp. 4. 1 plate.

The udder is separated into halves, and each half is placed in cold storage at 0°F. It is left for 18-24 hours and is then allowed to thaw slowly at 35°F. for 24 hours. By this method, the tissue is sufficiently firm to cut sections ½-1 inch thick with smooth regular surfaces. These are placed in running water to remove

milk. The sections are drained and placed in a 1:2,000 aqueous solution of acid fuchsin for 5-10 minutes.

When the glandular tissue becomes red, staining is stopped and the section transferred to cold running tap water. The glandular tissue becomes colourless and the connective tissue a dull pink. The section is then placed in a 0·1% solution of glacial acetic acid in cold tap water. The connective or fibrous tissue then becomes bright red. No method of preserving the specimen has been found, so it should be examined or photographed at once.—JOHN FRANCIS.

TOKURA, N. (1938). Eine einfache Apparatur zur Plattenkultur von Anaerobionten und Tuberkelbazillen. [**An Apparatus for the Surface Culture of Anaerobes and Tubercle Bacilli**].—*Zbl. Bakt. I.* (*Orig.*). **141.** 203-205. 2 figs. [7 refs.]

Description of a small piece of apparatus which may be used for anaerobic culture and in which the progress of growth can easily be watched. It is also claimed to be useful for the culture of tubercle bacilli. For anaerobic work oxygen is absorbed chemically; the whole apparatus is actually an elaborated modification of the Fortner plate.—E. J. PULLINGER.

JOCKOVIC, M. (1939). Harnuntersuchung bei Haustieren mit den Pulverreagentien nach Lipp. [**Examination of Urine in Domestic Animals with Lipp's Powder Reagents**].—*Tierärztl. Rdsch.* **45.** 439-442. [6 refs.]

Although in many cases an examination of the urine is essential for a complete diagnosis, practitioners commonly omit this important source of evidence. With Lipp's powder reagents, however, the examination can be simply and quickly carried out in the field.

Seven reagents are available, " albucit " for albumin, " bilirucit " for bile pigments, " sanguicit " for blood, " pyocit " for pus, " sacharicit " for sugar, " acetocit " for acetone and " kolocit " for coliform bacteria. A few drops of the urine are placed on a little of the requisite powder in a test-tube or on a piece of paper and the reaction noted. A positive reaction is indicated usually by a change of colour. J. tested " albucit ", " bilirucit ", " sanguicit " and " pyocit " on numerous samples or urine and claims that the results were highly satisfactory. The remaining three reagents were not tested.—J. A. NICHOLSON.

MISCELLANEOUS

—. (1938). **Report on the Meeting of Serologists of the Permanent Commission of Biological Standardisation (Paris, October 19th to 22nd, 1938).**—*Bull. Hlth Org. L.o.N.* **7.** 683-712. [4 refs.]

Variations in the results which are obtained in the assay of tetanus antitoxin are considerably larger than can be ascribed to errors inherent in the methods adopted. They are thought to be due to qualitative differences in the toxins and antitoxins. Further investigation is recommended in order to obtain potency values of samples more accurately representing their clinical value.

The adoption of a second international standard for staphylococcus antitoxin is necessary as a result of the depletion of the stock of the first standard, and the Commission recommends that the dry, stable preparation of staphylococcus antitoxin prepared at the National Institute for Medical Research, Hampstead be adopted as the second international standard and that the international unit be re-defined as the specific antitoxic activity contained in 0·2376 mg. of this preparation.

The Commission considers it essential to establish a subsidiary international standard for tuberculin for use on human beings, corresponding as closely as possible to the preparation known to American workers as P.P.D. ; to that end it requests the Copenhagen Biological Standards Department to prepare or procure a sufficient quantity of such tuberculin, the potency of which shall be defined in relation to that of the present international standard of old tuberculin.—H. V. H.

ANON. (1934). **Quarantinable Diseases of Animals in Australia.**—*Hlth, Canberra.* **12.** 1-2.

Of the notifiable diseases, rinderpest, foot and mouth disease, sheep pox, rabies, glanders, dourine, swine fever, contagious bovine pleuro-pneumonia and anthrax, only the two last occur in Australia and there are relatively few cases.

An official health bulletin for Australia is published monthly in the journal " Health ", and a monthly return is sent to the *Office international des Epizooties* at Paris.—T. S. GREGORY.

—. (1939). **Animal Husbandry and Milk and Milk Products in the Colonial Empire.**—*1st Rep. Coun. Nutrit. Colonial Empire.* Part I. pp. 59-67. London : H.M. Stat. Off.

This report deals primarily with human nutrition, but animal diseases, including rinderpest and contagious bovine pleuro-pneumonia, are mentioned as difficulties to be overcome in the breeding of cattle in the tropics. There are also notes on the production of goats, sheep, buffaloes and poultry. The main part of the report deals with the importance of milk and milk products in nutrition.

—. (1939). **Report of the Committee on Education. [Amer. Vet. Med. Ass.].**—*J. Amer. vet. med. Ass.* **94.** 294-299. 1 table.

Details are given of the number of veterinary students enrolled at veterinary colleges in the United States and Canada. It was estimated that 369 students would graduate in the United States during the year.

The committee began an enquiry into the departmental organization of the veterinary faculties of North America. Information is being obtained concerning the training and experience of the staff of the colleges, their memberships in professional societies, and their attendance and participation in professional society meetings. In addition information is being collected with reference to the time devoted by the college staffs to research and teaching in the major subjects of the veterinary curriculum, *viz*, anatomy, physiology, pharmacology, bacteriology, pathology, clinical medicine and surgery.

A list of colleges, graduates of which are approved for membership in the American Veterinary Medical Association, is given.—J. C. WALLACE.

MICHAELIS, L. S. (1939). **Principles of Medical Research. The Limitations of Histology.**—*Lancet.* **236.** 186-187.

M. utters a warning lest too much reliance be placed upon the static findings of morphology as opposed to the more dynamic ones of clinical and physiological observation in the solution of problems of disease. He considers that pathological histology has its limitations ; alone it is unable to provide sufficient evidence for or against the identification of diseases, for what one sees on a slide are the responses of cells or tissues to aetiological factors, and whilst the numbers of factors is almost unlimited the variety of responses is not. Moreover, each kind of cell or tissue has to rely on its own specific and limited choice of responses to the great variety of factors able to provoke a response. The histologist can describe the responses

but he cannot with certainty draw conclusions as to their causes from this examination alone.—H. V. HUGHES.

CHLÁDEK, V. (1938). Základy a význam veterinářské statisiky. [**Veterinary Statistics**].—*Zvěrolék. Obz.* **31.** 361-370. [German summary]. [Abst. from short English version in *Vet. Rec.* **50.** 927].

A plea is made for more complete statistics of animal diseases, including a uniform index of diseases, causes of death, and economic losses, compiled according to a plan which would be of international value. It is pointed out that annual reports of army veterinary services vary in the information given and so cannot be compared. Also State veterinary reports deal mainly with the recognized notifiable diseases and often give little information concerning such important conditions as infectious abortion, mastitis, parasitic invasions and diseases of young animals.—J. C. WALLACE.

ANON. (1938). **Poultry Regional Research Laboratory [East Lansing, Michigan].** —*J. Amer. vet. med. Ass.* **93.** 31.

This is a notice about plans for a new poultry regional research laboratory to be established at East Lansing, Michigan, as a headquarters for co-ordinating poultry disease research in 25 North Central and North Eastern States.

Fowl paralysis will be one of the first problems to receive attention.

OFFICIAL AND OTHER REPORTS

INDIA. (1938). **Annual Administration Report of the Army Veterinary Service in India for 1937-38.** [DIBBEN, H. C.]. pp. 48. Numerous tables. Simla : Govt. India Press. [8vo].

The Military Veterinary Laboratory at Lahore, started in 1936, has proved of great value in the examination of specimens and the investigation of outbreaks of disease. Special attention has been paid to the elaboration of the blood bilirubin test, suggested by Russian workers, for equine encephalomyelitis [see *V. B.* **7.** 115]. [The ability to diagnose such a condition on the result of a test for bilirubinaemia would appear to be doubtful. Bilirubinaemia is not a characteristic of the disease as it occurs in the United States, although it is of the Russian type. Ed.]

In collaboration with the Imperial Veterinary Research Institute, Muktesar, work on strangles continued and a start was made on the investigation of sterility in mares.

INFECTIOUS DISEASES.—There were 26 fatal cases of ANTHRAX during the year. The most serious outbreak (19 deaths) was in camp, under service conditions, in Waziristan. The source of fodder was changed, and immune serum given. In the Zhob area 1,700 horses, mules and camels were immunized with a spore vaccine and no case occurred in Army animals, although the disease is very common in that area. Immunization was equally successful in Eastern Bengal. A few cases of BRUCELLOSIS occurred in military dairy farms and in the horse-breeding areas of the Punjab. As usual STRANGLES was very severe in the large remount depots ; over 1,000 young stock were affected, with 80 deaths.

2,950 cattle were immunized against RINDERPEST, and no case of the disease occurred among military animals. 17 horses were affected with EQUINE CONTAGIOUS PNEUMONIA ; neosalvarsan, in 3 g. doses intravenously, is said to have been beneficial. There were 27 outbreaks of FOOT AND MOUTH DISEASE, involving 1,560 animals. INFLUENZA was widespread, 7,000 horses being affected.

There was a decrease in cases of EQUINE PIROPLASMOSIS. Acaprin was used in a number of cases with good results, but did not appear to be more beneficial than quinine hydrobromide. There were 340 cases of SURRA in camels, chiefly on service on the frontier. The use of the mercuric chloride test and treatment with naganol reduced losses and loss of efficiency in camels to a minimum. JOINT-ILL still causes serious losses in the horse-breeding areas.

NON-INFECTIOUS DISEASES.—The number of cases of COLIC was high (2,700), many cases being due apparently to faulty feeding and bad stable management. There was a considerable reduction in the number of cases of PARAPLEGIA. Over 2,200 horses and 1,100 mules were treated for LAMENESS—due in the large majority of cases to such diseases as ringbone, spavin, navicular disease etc. Of these over 500 horses and 300 mules were cast or destroyed. 860 horses, 870 mules and 29 camels were castrated. Two horses died following the operation, one of tetanus and one of peritonitis.

During the Waziristan operations, 100,000 slaughter animals were inspected, 23,000 being rejected.—F. J. ANDREWS.

GREAT BRITAIN. (1938). **British Empire Cancer Campaign. Fifteenth Annual Report Presented at the Meeting Held at the House of Lords 29-11-38.** pp. 270. 5 figs. on 1 plate, 5 tables. [Numerous refs.] London: British Empire Cancer Campaign. [4to].

The greater part of this report describes briefly the research work on all aspects of the cancer problem carried out during 1937-38 at the various centres, throughout the British Isles and overseas, which receive grants from the British Empire Cancer Campaign. These grants amounted during the year to more than £57,000, and some idea of the amount of research work carried out can be gathered from the fact that the report deals with over 100 scientific papers as well as a wealth of unpublished work.

The report gives a very valuable summary of the most important research work on cancer during 1937-38, and, together with the report of the Imperial Cancer Research Fund, forms a complete and invaluable work of reference.

[There appears to be no reference to work on spontaneous tumours of domestic mammals, nor is there any record of a grant to a veterinarian. In view of the wealth of material available from spontaneous tumours in domestic animals it would seem that a careful study might throw some light on the problem of cancer, a problem which becomes ever more complex. It is to be hoped that some such investigation will be made in the near future. Of the members of the Grand Council and various Committees the only veterinarian was the late Sir Frederick Hobday.]—E. G. WHITE.

DENMARK. (1938). Aarsberetning fra veterinaerdirektoratet for aaret 1937. **[Report of the Veterinary Directorate for 1937].** [HANSEN, P.] pp. xx + 210. Numerous tables, 1 map. Copenhagen: A. Johansens Bogtrykkeri. [8vo].

The most important stock disease feature of the year was the appearance of foot and mouth disease in Denmark in August 1937; 13 outbreaks occurred up to the end of the year and about 168,000 Kr. was expended in compensation for animals slaughtered. [The course of the disease in 1938 is also outlined. By October close on seven million Kr. had been expended, but over one million Kr. was recovered by the sale of meat from condemned animals. The slaughter policy was stopped at this point].

Compensation for compulsory slaughter was also paid in the case of malignant foot-rot in sheep, of which 40 outbreaks occurred : 1,200 sheep were killed and 24,422 Kr. was paid.

In the campaign against tuberculosis 611 cows were slaughtered on account of uterine TB. and 462 for udder TB. Tuberculin tests were carried out on 75,351 animals in 5,015 herds as initial orientation tests and on 340,392 animals in 16,929 herds which had been tested before. [Results are not given for these groups]. Tests on special diary herds showed that 94 % of 2,671 herds were clean

Figures for laboratory diagnosis show that 5,184 out of 17,517 samples of material were positive for bovine brucellosis.

The following numbers for outbreaks and affected animals (in brackets) show the extent of the more important of the remaining diseases reported :– strangles 1,700 (4,169) ; anthrax 55 (65) ; swine erysipelas 1,287 (3,498) ; swine plague 1,408 (9,665) ; blackleg 18 (24) ; calf diphtheria 204 (1,055) ; ringworm 1,237 (6,440) in cattle, 15 (23) in horses, 418 (1,903) in swine and 6 cases in dogs ; equine influenza 39 (87) ; dog distemper 1,949 cases ; cow pox 841 (7,371) ; equine mange 27 (50) ; dog mange 864 cases ; equine infectious paraplegia 8 (17) ; bovine bulbar paralysis 9 (42) ; genital vesicular exanthema 46 (86) in mares and 3 (12) in cows ; bovine malignant catarrh 31 (47), and purpura in horses 92 (115).

A few reports from district veterinarians on certain diseases are also given, as well as records on poultry diseases and parasitic diseases, cases of poisoning and the livestock industry.—J. E.

GERMANY. (1939). Dienstbesprechung der Leiter der Tiergesundheitsämter am 4. 2. 1939 in Berlin. **[Meeting of the Directors of the Animal Health Offices, 4. 2. 39]**.—*Dtsch. tierärztl. Wschr.* **47.** 273-277.

Reports are given of four addresses. (1) KARSTEN read a paper on brucellosis in Africa [*V. B.* **9.** 614]. (2) GRZIMEK spoke on the Cattle Health Service, outlining the problems of disease eradication. (3) SCHUMANN spoke on the voluntary Swine Health Service, describing his experience in Silesia where some of the breeding herds have been under supervision since 1935. Piglet influenza and rhinitis (" Schnüffelkrankheit ") were the two most important diseases. Orthodox control measures have been beneficial. (4) WEISGERBER spoke on the Poultry Health Service, quoting a few figures from mortality statistics and reporting an advance in pullorum disease control. At the end of 1938, 42 % of all supervised flocks were free from infection.—J. E.

—. (1937). Helsingfors stads Mjölkkontrollstations- och Helsingfors Mjölkkontrollförenings årsberättelse för år 1936. **[Report of Helsingfors Milk Control Station for 1936]**.—*Suom. Eläinlääkäril.* **43.** 365-368. 1 fig., 1 table.

The Milk Control Station at Helsingfors carries out all laboratory examination of milk, and the town's Milk Control Association undertakes instructional work. During the year 105,920,962 litres of milk and 1,983,578 litres of cream were received. Ordinary commercial milk and cream from each retailer is examined twice monthly, but better quality milk and " I V " (vitamin-rich) milk is examined twice weekly. The examination includes physico-chemical tests as well as microscopic and bacteriological tests. Great care is given to the supervision of producers' premises ; veterinarians and medical officers regularly inspect them and the personnel, and report on the presence of infectious disease.

The Milk Control Association has made a collection of models of dairy and milk hygiene apparatus, cow byres etc. for use as exhibits for demonstration to farmers.—R. STENIUS.

DUTCH EAST INDIES. (1938). Jaarverslag van het Veeartsenijkundig Instituut, Buitenzorg, Java, 1937. **[Report of the Veterinary Institute, Buitenzorg, Java, for 1937]**. [HUBER, F. L.] pp. 35. 3 tables. [8vo].

The year was noteworthy on account of the large scale immunization carried out for the prevention of infectious diseases—chiefly against haemorrhagic septicaemia. The senior personnel remained unchanged.

The work of the Diagnostic Section is given mostly in tabular form but several research items are also reported. Of many preparations tested for the treatment of " cascado " (stephanofilariasis of buffaloes) Cooper's dip in dilutions of 1:20 to 1:50 gave the best results. Work on anaerobes confirmed the fact that *Clostridium chauvoei* and *Cl. septique* are immunologically distinct. In the diagnosis of blackleg, culture on " blood plates " provides a rapid and useful method. Work on surra failed to demonstrate the existence of a naganol-fast strain of *Tryp. evansi*. An attempt to identify a cattle disease in Lombok, named " Sakit ingoesan ", failed; it may be bovine malignant catarrh. Other researches still continuing are also referred to.

The Serological Section carried out tests for anthrax, glanders and brucellosis, results being tabulated; the two latter diseases were far from rare. Some observations were made on meliodosis in horses and on the reactions to mallein of horses affected with this disease. *Pfeifferella mallei* grown for ten years on ox-bile media was tested, with negative results, as a vaccine against glanders. Observations were also made on the rapidity of infection and antibody formation in glanders.

Results of tuberculosis diagnosis are tabulated. The ophthalmic tuberculin test and the double intradermal test with Glover's tuberculin were compared on 100 cattle, and the results checked with P.M. findings. The former test was very unreliable and the latter gave two false positive and six false negative results [apart from some results recorded as doubtful].

The Serum-Vaccine Section made immunizing agents for use against haemorrhagic septicaemia, anthrax, blackleg, bovine brucellosis, colibacillosis, swine fever and fowl pox (figures given). The great success of vaccine and serum against H.S. is referred to, and mention is made of post-vaccination shock, which is encountered, and in one instance, affected 337 of 13,000 buffaloes in Bandoeng, where no immunizations had been carried out during the previous eight years.—J. E.

BOOK REVIEW

KAHLFELD, F. [Laborant am Preuss. Institut für Infektionskrankheiten Robert Koch, Berlin], & WAHLICH, A. [Laboratoriums-Techniker an den Betriebs-Laboratorien der Meierei C. Bolle A.-G., Berlin]. (1938). Bakteriologische Nährboden-Technik. **[Bacteriological Culture Medium Technique]**. pp. xvi+168. 29 figs. Leipzig: Georg Thieme. [RM. 6.75].

The book is divided into sections on liquid media, solid media, general technique, preparation and use of stains, preparation of sections, laboratory procedures, the Wassermann reaction and a general section on the construction and handling of apparatus. It is the third edition of a work intended primarily for technical assistants, and is essentially practical. The sections on the preparation of liquid and solid media are of value for reference purposes, and so to a lesser extent is that on staining. The other sections are only of interest to junior students or laboratory assistants.—P. S. WATTS.

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